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AMERICAN
JOURNAL OF INSANITY,
FOR APRIL, 1881.

THE CONDITION OF THE BRAIN IN INSANITY.

BY THEODORE DEECKE.

The pathology of brain diseases of which "insanity" is considered an evidence, is still one of the problems of medical science. The pathology of an organ as a doctrine, presupposes the most complete knowledge of its physiology; in fact, it is but the physiology of the organ, under the influence of abnormal conditions and processes. Now, as to the physiology of the brain as the organ of mind *par excellence*, little is known, and we have neither an apprehension nor any idea of the mode of operation of the nervous organism which is supposed to be concerned in the act of perception, in thinking, reasoning and acting with freedom. Since, therefore, insanity in its very nature moves entirely within the sphere of these phenomena, it is evident that of the pathology of the organism supposed to be involved in its manifestations, nothing can be positively affirmed. We therefore prefer to the term "Pathology of Insanity," commonly in use, the more general term, placed at the head of this article "Condition of the Brain in Insanity." We have, indeed, to confine ourselves to the description of the anatomical changes in the structural elements of the brain, observed in connection with the different forms in which insanity presents itself, and to

the determination of their nature, of their seat in the organ and their probable origin. It will not be disputed that, from a practical point of view, a thorough knowledge of these conditions is not only most desirable, but imperatively necessary, forming as it should, the basis of all successful medical treatment and management of the disease. This holds good even in spite of the fact that the general principles of the latter have been anticipated from conclusions drawn from skillful clinical observations and every one will acknowledge the modifying and correcting influence of a closer insight into the pathological changes to which the elements of the affected organ are subject.

All progress in this direction is derived from researches in the line of Virchow's cellular pathology and its results. The grand and pregnant idea of this doctrine is, that the *cell* itself, as the last structural element of all organs of the body, is not only the bearer of life, but also of disease. With the establishment of this doctrine, the principle of the localization of disease was practically introduced into medicine, and became the foundation of pathology, as well as the leading idea of all rational therapeutics. It is also well known how greatly this principle, brought face to face with clinical facts, has advanced our knowledge of the organs and their constituent parts, and the nature and localizations of their functions. Especially in the case of the brain, almost all that is known of the psycho-physiology of the organ, has been derived from this source, and from it alone can further information be expected.

Thus it has been established, beyond dispute, that the psycho-physical apparatus, which is concerned in pure mental activity, has its seat in the grey cortical substance of the convolutions of the brain, viz.: that

perception, the formation and the association of ideas; memory, reason, attention, the emotions and volition, are dependent upon the operations of a nervous apparatus situated in the cortex cerebri of the hemispheres. Without this apparatus there is no manifestation of mind, no thought; its defect involves a defect of mind, its impairment, an impairment of mind. Aside from this, however, nothing is positively known of the special physiological functions of this apparatus and its constituent parts. Yet we seem compelled to assume the existence of the most universal relations of all its elements with each other, which may, however, physiologically and anatomically, be subject to variations in each case according to individual organization. A further localization of function, however, as regards the manner in which different faculties of the mind might be attributed to different regions of the grey cortex, to single or different groups of the convolutions, has not yet been proved by facts. The recent division of the brain into areas of different order and significance, as the result of conclusions arrived at from pathological observations and from physiological experiments, has nothing to do with the question here considered. All phenomena connected with those experimental observations relate solely to localizations in the white fibrous tracts of the brain, and in the subganglia of grey matter at the base of the organ, in the pons, the medulla oblongata and the spinal cord. The extension of these facts of localization over the organisms of the grey cortical ganglia, is an outgrowth of the supposition that direct anatomical connections exist between the white fibres and the ganglionic cells, at the points where the former terminate in the cortical grey matter. This relationship of the two elements to each other, however, has not yet been substantiated. Con-

cerning the highest developed ganglionic organisms in the peripheral grey cortex of the hemispheres, the idea of their anatomical and physiological unity, and the possibility of substitution, and of re-establishment of function must not be lost sight of. Localized lesions or foci in the grey substance, as is known from pathological as well as physiological observations, either do not give rise to any noticeable disturbances or to disturbances in the whole intellectual sphere; whilst all diffused affections, without any exception, present the latter association.

The general feature of the brain of persons who die insane is that of atrophy of the organ in the widest sense of the word, arising from disorders in its proper nutrition. This points, first of all, towards one common source, viz.: affections of parts of the sympathetic system in their function as regulators, not directly as regards the nutrition of the elementary constituents of the organ, but rather the active part which the circulatory apparatus plays in the processes of nutrition. The first anatomical changes observed, therefore, are palpable lesions in the vascular system of the organ. It must be borne in mind that the vascular ducts, and especially their nutrient part, are not simply a system of passive tubes in which the blood circulates, leaving the office of the exchange of oxygen and carbonic acid, and of the other nutritive materials solely to the active powers of the tissues with which they communicate. The degree and the character of this exchange, in each case, is also dependent upon the peculiar functional nature of the endothelial lining of the vessels and of their special condition. It is well known to what great alterations the latter may become subject, by changes in the composition of the blood, by the presence or absence of certain chemical compounds in the same,

by changes in the velocity of the blood current, and also in the pressure of the blood in the vascular ducts. It is not difficult with our present knowledge to form an idea of the extent to which the interchange between the nutrient material of the blood and the tissues may become influenced by such alterations in the condition of the vessels, when we remember that the normal permeability of the endothelial lining for gaseous substances and solutions may give way in the one extreme to a state in which it becomes permeable to the plasm and even to the organized elements of the blood themselves, while on the other extreme the endothelium may be so altered that the ordinary interchange of matter appears either reduced in quantity and quality, or is rendered impossible and ceases entirely. This is not a theory based upon suppositions and conclusions, but a truth founded upon facts accessible to observation. These conditions, although commonly of a transitory nature, may assume under certain circumstances a chronic and permanent character. In the one case the anatomical change consists in a contraction and an induration of the endothelial lining of the vessels, associated with a slow infiltration of the cells with substances from the normal waste of the tissues, by which the interchange of matter between the tissues and the blood becomes impaired. In farther advanced stages this material may be deposited in the perivascular spaces and accumulate in the surroundings of the vessels forming the groundwork for neoplasms and cell proliferations. In the other case the nutrient ducts are abnormally dilated, which favors more or less rapid changes in the state of fullness of the vessels, fluctuations between capillary engorgement and anæmia. They are marked, in general, by an increase of interchange of matter in the parts affected at the expense of the tissues involved.

Both these conditions are most intimately connected with the two primary forms of insanity, the former generally with the symptoms of melancholic, the latter with those of maniacal excitement. In the development of these conditions the most various causes may play an important rôle. They are either of primary nature or the result of pathological processes extending from other organs of the body into the nervous centers. In the former case the causes are of purely nervous origin. In the latter case there are three causes from which the alterations referred to may originate, viz: 1, changes in the composition of the blood and all those affections which produce such changes; 2, Tuberculous infiltration and 3, Syphilitic infiltration.

The effect of changes in the composition of the blood upon the nutrient vascular system of the nervous centers, will be understood and can be estimated when we remember that all organs of the body suffer more or less from the influence of the affection. The morbid constitution of the blood, aside from the structural changes in the vessels and their results, adds to the deficiency in the proper nutrition of the tissues involved. In the brain, in these cases in such conditions, the peculiar vascular arrangements, the division into small areas of nutrition by the large number of terminal arteries, favor an unequal distribution of the blood, the development of transitory local hyperæmia or anæmia, of serous exudations, of local inflammations, even of hæmorrhages. All forms of chlorosis and anæmia are liable to produce these conditions, as lencocythæmia, oligocythæmia, hydræmia and anhydræmia, progressive pernicious anæmia, pyæmia and septicæmia. Of other diseases connected with alterations in the composition of the blood may be mentioned: the acute febrile processes; as pneumonia, pleuritis, acute articular rheuma-

tism, insolation, meningitis; further, infectious and epidemic diseases; as scarlatina, variola, intermittent fever, typhus, erysipelas, pellagra and toxications; as alcoholism, absynthism, chloroformism, chloralism and saturnism. The forms of mental disturbances associated with these affections, or following them, are delirium, melancholic and maniacal excitement and their sequences. In the first the vascular districts, principally affected, are those located in the temporal convolutions; in the second and third they extend over the parietal and the anterior and posterior central convolutions, and in the fourth involve also the frontal lobe and the base of the brain, including the pons and the medulla oblongata.

The structural changes produced in the vascular system of the nervous centers by tuberculous and syphilitic infiltrations are well known, as they are of a marked character and interfere gravely with the normal functions of the vessels. The tuberculous infiltrations produce lesions more locally confined, and severely attacking the capillary ducts; in the syphilitic the whole arterial apparatus is more likely to be involved and may thus lead to extensive changes in the whole nutrient system. In both these conditions the final effect is always a diminution in the interchange of matter which is therefore prominently associated, with symptoms of mental depression, alternating in the latter not unfrequently, with periodical states of delirium and subacute maniacal excitement.

We proceed to the class of causes of purely nervous origin. It is well known how readily the whole circulatory apparatus responds to unexpected or unusual irritations of sensory and other nerves. Since by these, first of all, the regular contractions of the heart are affected, it shows that, aside from the intra-cardial innervation, which controls the normal rhythmic move-

ments of the heart, other extra-cardial innervations exist, through the influence of which the heart's action may, according to circumstances, become accelerated or arrested. With similar arrangements, viz., a peripheral as well as a central innervation the whole vascular system is provided. In both the innervating fibers of the latter, in their course combining with fibers of the sympathetic system, center in a number of grey nuclei, located in the lower and in the middle third of the medulla oblongata. All these centers are connected by sensitive fibers with the psychical tracts of the brain. They are withdrawn, however, from the direct influence and control of the psychical operations, and, as it seems, are rendered irritable solely by blood stimulation. In their relations to mental processes, therefore, the facts point toward a chemical mode of action, viz., by the development of certain compounds in the blood, as the result of those psychical irritations, by the action of which, in a given case, the one or the other of the circulatory centers, by special affinity, becomes excited. This theory, supported by recent interesting discoveries, may, however, at present, be apt only to pave the way for a conception of the facts; yet the main undisputed point is the involuntary influence of psychical irritations upon the circulatory apparatus. In cases where these influences are of prolonged duration and sustained, as occurs most frequently, by states of general ill-health from overwork, care and anxiety, by neglect of the ordinary requirements of life, or by excesses in the one or the other direction, they are of course most liable to be reflected upon the vascular system, and there produce all those changes of a permanent character, with their results as already referred to.

In order, however, to fully appreciate the significance and extent of the influence of these psychical irritations, it is necessary to recollect that the psychical tracts and centers in the brain, aside from their direct communications with the special sensory apparatus, by sensory fibers, are likewise connected with each organ of the body, or part of it, through fibers of the sympathetic system. By this arrangement, reflex irritations from all organs continually take place in the psychical tracts, giving rise, in proportion to the normal or abnormal state of function of the former, to feelings either of well-being, of pleasure or of discomfort, or even of pain. Not to feel any organ, is considered, according to the vulgar opinion, an evidence of perfect bodily health. This, however, does not mean the entire absence of all reflex irritations in the psychical centers, but the presence of those only by which the feeling of the entire harmonious function of all organs is created. In the opposite case, these irritations, when of inharmonious character, and pointing toward disturbances of function in the one or the other direction, are felt as a constant strain upon the mind, whereby its operations are seriously interfered with, and more especially those which are not under the direct control of the will. This is the great source of the numberless so-called sympathetic affections in which, by transmission through the nervous system, morbid conditions are transferred from one organ to the other. Underlying all these, we have, first of all, circumscribed disorders in the circulatory system of the organ, as that, most easily affected by nervous irritations, and following which, disturbances of nutrition, assimilation and secretion are developed by sympathy.

In regard to affections of the vascular system of the brain, therefore, and their consequences, the effect

should not be under-estimated; for example, of diseases or injuries of peripheral nerves, of heart diseases, of affections of the digestive tract, of helminthiasis, of diseases of the liver, the kidneys, the sexual organs, of pregnancy, puerperal diseases and lactation. The degree and the extent of the reflex irritations thus produced are, of course, subject to great variations and dependent upon uncontrollable circumstances, because they depend on the physical and psychical individual constitution, and upon the existence or non-existence of neuropathic predisposition. Before all these causes, however, the primary affections of the psychical tracts, of psychical origin, here come into consideration. To these must be reckoned states of congenital mental weakness, habitual lack of self-control and mental excesses of all kinds, over-straining and over-work on the one side, idleness and defective mental and moral training on the other.

As the final effect, then, of morbid conditions of the vascular system of the brain producing palpable changes, we designated disturbances in the nutrition proper of the tissues of the organ. These may consist, perhaps, at the outset, solely of changes in the molecular constitution of the living cell protoplasm. These processes are beyond observation and can not be followed up, since molecular pathology is still but a problem in science. This seems to have led to an attempted distinction between so-called functional and organic affections of the brain and the nervous system, which ascribed the former merely to the chemico-pathological processes, the latter to alterations in the formative elements of the organ. Yet, the necessary assumption of the unity of form, composition and function in an organic entity, does not justify this distinction, and where functional disturbances can not be proved as being

concomitant with structural changes, this should be attributed rather to the insufficient means and methods of demonstrating their presence. Indeed, improvements in the latter have constantly diminished the number of such cases and greatly enlarged our knowledge of the more minute histology of the parts in question, and of the changes to which their elements are subject. It is, at present, almost universally admitted that the more complete and accurate investigations of this kind are carried out, the more frequently they lead to the discovery of palpable products of pathological processes, where some years ago none were detected. This has especial reference to the brain and its affections in cases associated with insanity.

The view has been entertained that the structural elements observed to be affected, next to the vascular system in the brain of the insane, were those of the connective substance, the so-called neuroglia. This is not quite correct so far, at least, as the primary and acute forms of the disease are concerned, and particularly those of purely nervous origin as explained above. In these cases, even in the very beginning, the cortical nerve cells themselves present changes of a very marked character. These cells are located in the middle stratum of the grey cortical substance of the convolutions of the brain. This is lined toward the peripheral arch by a layer of neuroglia tissue of reticulated structure, built up of the delicate, manifold interwoven, fibrous processes of irregularly star-shaped corpuscles. Toward the centrum ovale the middle stratum is bordered by a tissue containing small polygonal cells provided with very fine ramified processes. The nerve-cells themselves in the middle stratum are pyramidal bodies running out, in a perpendicular line, toward the upper layer of neuroglia tissue, in a pointed

conical prolongation of considerable length, while they emanate from the base, in the opposite direction, a variable number of smaller processes which divide into the most delicate rootlets. The matrix in which all these cells, as well as those of the other parts of the grey cortex are imbedded, consists of a tissue of a felt-like texture, which after death, in carelessly preserved specimens, appears as of molecular constitution. The pyramidal cells can be divided, according to shape and size, into two classes. The smaller ones, more uniform in size and greatest in number, occupy the upper stratum of the layer, the larger of a more elongated form, the lower stratum. The latter vary much in size, and occasionally, in all convolutions of the convexity of the brain, some single cells of extraordinary magnitude may be found here and there.

No other law of organization as to the distribution and the arrangement of these cells has been thus far detected. On the contrary in this respect the greatest variety seems to prevail not only in the individual convolutions, but also in the convolutions of the brain of different individual beings.

The white fibers of the centrum ovale terminate in the same layer, radiating towards the peripheral hemisphere of the convolutions after having entered the middle portion of the convolutions in solid masses.

Their mode of termination is by breaking up, dividing and subdividing into the most minute fibrils. The finest of these fibrils are interrupted by, or have on the line of their course, small spherical bodies, in one of which they finally end. These are the ultimate organized elements, distinguishable by the use of high microscopic powers; they are indeed so minute that they are incapable of direct measurement. This mode of termination of nerves in the central organs is in essence the

same as that of the fibers which enter the posterior grey centers of the spinal cord and the medulla oblongata. There is no apparent connection between the nerve cells and these fibers in so far that the axiscylinder of the latter seems to be a direct continuation of one of the protoplasmic processes of the cells. This latter has only been observed in the case of the cells and fibers of the anterior grey horn of the cord.

The terminal points of the fibers constitute the whole area of the middle layer of the convolutions above the area containing the polygonal cells. Some of them seem to enter even the upper layer containing the star-shaped corpuscles, so that there is possibly a communication with the peripheral prolongations of the pyramidal cells; while others terminate in the districts of their basal processes. The grey layers of the convolutions, as well as the white fibrous strata, contain furthermore numberless round and slightly oval cells, the so-called nuclei of the neuroglia. They vary in size and are perfectly circumscribed without any attached processes. And, to conclude this brief histological sketch of the grey cortex, it remains to mention the lowest layer in which spindle-shaped or bi-polar cells are located, arranged in such manner that their longitudinal axis is parallel to the course of the arching fibers by which neighboring convolutions are connected with each other.

In regard to the functional significance of the different cells and fibers all is more or less hypothetical. Even the question whether the neuroglia tissue is of nervous nature or not has not been decided. In its anatomical constitution it closely resembles the nervous tissue. Its finest organized elements can not be distinguished from those of the latter, and it is not improbable that it forms, with the whole nervous system a continuous network, impregnated by, or suspended in a solution of

saline and albuminoid substances. Concerning the nerve fibers there is no doubt that they are the connecting medium between the peripheral and the central expansions of the nervous system, and as such the conductors, both of inward and outward impulses. They are the site of specific energies and the prototypes of functional localizations, and it seems natural that the single fibers or groups of fibers retain their characteristics up to the finest ramifications and terminate in the grey matter with their specific energies. As far, therefore, as their districts of distribution are concerned, the division of the brain into different areas of function or areas of different function appears to be a correct interpretation of nature. This explains also the results of the various physiological experiments by which the existence of intimate relations between certain groups of the convolutions of the brain, or even of small districts in the convolutions, to the special peripheric sensory expansions, or to certain groups of muscles have been demonstrated. Yet these experimental data should not claim to prove anything else than the fact that the observed effect was produced by the excitation, the destruction, or the removal of the ultimate terminations of the nerves themselves. At all event no conclusion can be drawn from them in regard to the functional energies of the other nervous elements or their participation in the production of the phenomena. Even when, for instance, the galvanic irritation of the grey cortex has shown that this or that system of muscles can be set in motion from this or that limited spot, in the one or the other convolution, this does not exclude the possibility or even the probability, that the same effect can be produced, by nerve force, from any other point of the grey cortical substance. Indeed the latter seems to be so necessary a demand that no other idea of the plan of organization

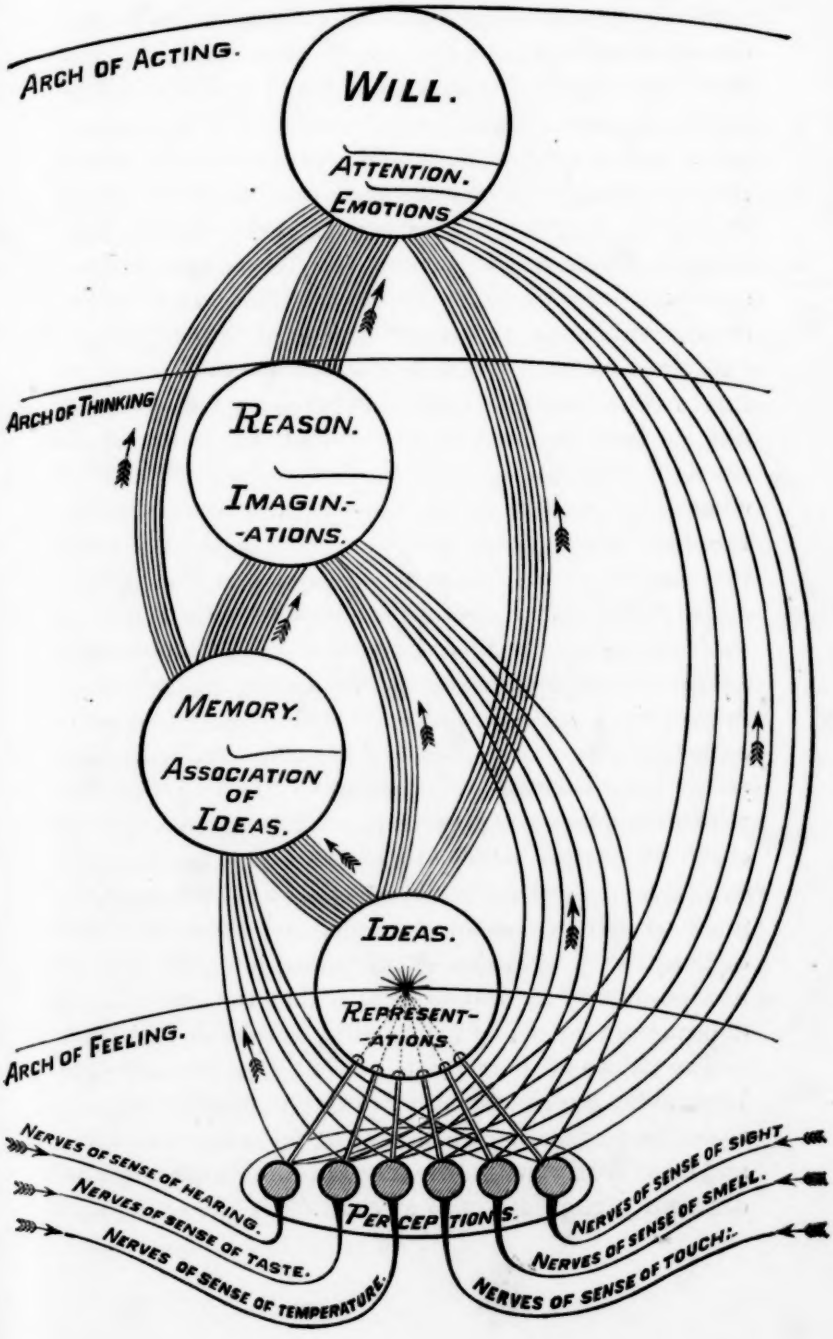
can resonably be entertained than that, which acknowledges the existence of universal connections in the force generating parts of the nervous centers. And this is more especially true of the nervous organism which is involved *par excellence*, in the development and the manifestations of mental energy and activity. This is of course, presumed to be the general plan of organization, according to which, for example, each part of the psychical tracts and centers, in conformity with certain laws of organization, can be excited by inward impulses from any part of the peripheral nervous expansions and, vice versa, transmit outward impulses to any part by simple reflex action or by reflex-operations controlled and modified by volition.

In a special sense, however, the greatest variations undoubtedly exist in the mode in which this plan, *de facto*, is carried out. There must be, indeed, as many differences in the inner connections and the courses of the psychical tracts, and the seat of the psychical centers, as there are differences in the individual natural dispositions, in natural development, in mode of education and degree of culture. The localizations in the psychical tracts and centers should, therefore, be regarded as so largely constituting the outgrowth and product of individual organization, that there remains but little hope of acquiring a more intimate knowledge of the apparatus and its workings in the direction of physical investigation and analysis. The application of psychological facts, however, arrived at by self-observation and the study of normal and abnormal mental manifestations, renders it possible to form an idea, at least, and to picture the apparatus and its inner organization, in general outlines. Such a picture, it is true, can not pretend to be more than a product of thought and fiction; yet, every one who entertains the

view, that science is advanced not solely by the collection, acknowledgment and arrangement of facts, will admit the right of theoretical speculations upon an analytical basis, whenever they aim to promote a closer insight into the relation of facts and phenomena which are not capable of immediate explanation. As a graphic method of demonstration, when practicable, greatly aids the verbal exposition of a subject, I have constructed a diagram of the central inward psycho-physical tracts and centers of the brain of man, which is designed to give a picture of their possible arrangement and supposed connections. For the purpose of simplification, the principal tracts and centers are alone outlined in the figure.

The diagram consists of circles, which represent the psycho-physical centers, in a sense to be explained hereafter, and of lines or bundles of lines showing the tracts by which the centers are connected with each other.

The six small circles at the lower end of the figure, surrounded by an elliptical line, represent the points in which the central sensations from inward impulses, viz.: the perceptions, take place. They also represent the areas of the termination of the six different groups of sensory nerves in the grey cortex of the brain, viz.: of the nerves of the sense of sight, hearing, smell, taste, touch and temperature. These areas seem to be situated, according to results obtained from physiological experiments, in a pear-shaped section of the brain, embracing the convolutions of the Sylvian or temporal, the parietal and the occipital lobe, and are regarded by many as the centers of perception in the brain. The correctness, however, of the facts and their interpretation, upon which this theory is based, is still disputed. But even admitting the facts, it does not necessarily follow that these terminations of the respective


ARCH OF ACTING.
WILL.
ATTENTION.
EMOTIONS
ARCH OF THINKING
REASON.
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-ATIONS.
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OF
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-ATIONS.
ARCH OF FEELING.
NERVES OF SENSE OF HEARING.
NERVES OF SENSE OF TASTE.
NERVES OF SENSE OF TEMPERATURE.
PERCEPTIONS.
NERVES OF SENSE OF SIGHT
NERVES OF SENSE OF SMELL.
NERVES OF SENSE OF TOUCH.

nerves represent their ultimate expansion in the grey cortex, nor that the centers of perception are confined to a nervous organism located in the convolutions above specified. The phenomena connected with the experiments, at least, as described by different experimentalists, are no other than would follow traumatisms, partial or entire destruction of the respective nerves at any point of their course below their central terminations. And since no one is willing to believe that in any of the experiments an injury or extirpation of the grey cortical ganglia alone was effected, without at the same time injuring or removing the nerve-endings which spread out in the same area, it remains a moot point to the effect of the injury or removal of which of the two elements,—the ganglionic cells or the nerve-endings,—the phenomena, are to be ascribed. The expressions therefore employed in order to designate their nature as, for example, "psychical blindness, psychical deafness, psychical anæsthesia," etc., are as inapt and misleading as the terms, deduced from them and applied to the respective places in the convolutions, as "perceptive center of the sense of sight, of hearing, etc." It seems altogether a difficult undertaking to detect in the group, which the phenomena present, anything more than the effect of partial or complete sensory paralysis. The existence of localizations of psychical functions, as confined to certain convolutions, has by no means been demonstrated by these experiments, and, in this connection, it may be well to remark that the circles in the diagram are not to be regarded as centers in that sense.

The circles of perception in the figure are connected by straight lines, pointing toward a common center, with the circle designating the place where the representations and ideas are formed, as the result of combining single and different perceptions into a whole. Of these the ideas

signify the products of the higher stage of psychical function. The circle, in order to indicate this, is crossed by a line marked "arch of feeling" which leaves the representations, as conceptions of a more general and one-sided character, in closer relation with the sphere of simple sensations and perceptions, whilst with the formation of ideas, as symbols of individualized conceptions, we gradually enter the sphere of constructing thought.

The next circle upwards represents the centers of association of ideas and of memory. The intimate relation of the two to each other justifies their juxtaposition in the figure. The circle communicates with that of ideas and representations by a main tract, which is designed to show that the latter are reproduced in the higher center. Here they are arranged in series of different order and succession according to laws of natural or artificial relation, or in accordance with empirical rules and regulations which, in each case, are the issue of individual development, self-training and education. Yet, it is a matter of daily experience that neither memory nor the lines of thought are moved solely by ideas and representations. On the contrary, as everybody knows from self-observation, they are, to a large extent, continually stimulated by simple sensations and perceptions. Hence it is evident that a direct relation must exist between them and the perceptive centers, as well as the central expansions of the sensory nerves. These are marked out in the figure by lines directly connecting them with the circle of memory and mental associations. The active formative influence of these direct stimulations of the latter upon the facts of memory and the nature of the associations, is a factor not to be under-estimated in the manifestations of mental life. In infancy they apparently constitute the foundation, and in early youth they exert a determining power in the development of both.

In the following circle reason has its site, and its auxiliary, imagination, the reproducing agent of the facts of memory and the mediator between reason and associations of thought, and without the aid of which no judgment or reason could operate. In reason man acknowledges the highest and most independent psychical function. Here the aim is to point out rather its dependency on the facts of memory and mental associations, and on its direct stimulation from the centers of ideas, and even of perception. The influence of these upon the construction and development of reason and thought is as universally important as the influence of metaphor upon the construction and development of language, and is the most plastic factor in the mental life of the individual as well as of nations, and races. This is not the place to follow up this subject any farther, but it will be conceded that language in fact is the organism through which reason manifests itself, that is, not the articulate or inarticulate sound of human speech, but the idea, the thought which is transmitted with the sound. Language may be called the image of reason, and the facts of its evolution, as preserved in the various modes of human speech, are the reflex of the history of reason in the history of mankind, from the loftiest revelations down to absurd developments of morbid human thought and imagination. Taking all this into consideration, it is evident that the measure of reason must be readily applicable to all the mental operations hitherto considered. In the circle of reason therefore, as indicated in the figure, terminate, aside from the main connection with the circle of memory and mental association, tracts from all the subordinate centers mentioned above.

With the circle of reason the sphere of thinking closes and we enter that of acting, occupied by the circle of

volition with its predisposing associates, attention and the emotions. The latter two may be aptly considered as direct incentives of volition, as apparently no act of the will can be executed, if not preceded and dictated by emotions and directed by attention. Their location in the figure seems therefore justified. In the regular course of the psychical processes volition is stimulated as well as controlled by the power of reason, which relation is indicated in the diagram by the main connection of the two. The remaining lines connect the circle with each of the lower centers separately, in order to show their intimate relation to these latter, and the possibility of direct transmission of impulses from them. Proof of the existence of such connection, as well as of the great power which they exert upon emotions, attention and will, are a matter of such daily experience that it may suffice to merely mention the fact.

As will be seen, only the inward or centripetal psychical tracts are outlined in the diagram, and even in this respect, the picture does not pretend to be more than a sketch. But it will be found useful, for our main purpose, to render possible an analytical and synthetical conception of the nervous organism, which is concerned in the manifestations of mental life, and to bring the phenomena of so-called mental alienation, or aberration of mind, at least for a part, within the reach of physical explanation. In this connection I would first of all have it borne in mind that this nervous organism is to be considered as a part of the whole nervous system, and subject to the same physical laws. No one will dispute the fact, that an injury, artificially produced or the result of morbid processes, of a sensory, motor or secretory nerve-tract, involves, in proportion to the extent of the injury, a paralysis of

the nerve, and an impairment or cessation of function in the sensory, motor or secretory organs of the body with which the respective nerve is in connection. Essentially the same thing takes place, when, instead of the nerve itself, its peripheral or central expansion is the site of the injury, since we have no means of proving that, for example, a physical power of vision, or hearing, etc., exists independently of the psychical, although some modern physiologists seem inclined, as we have seen above, to make this distinction.

I propose to consider the central nervous organism from a similar point of view, and whether it be regarded as a direct continuation of the central nerve-expansions, or as an independent organism only set in motion by impulses from the latter, is of no importance. In the organism we have cells or ganglionic bodies, centers for the generation of nerve-force—in the sense of the conversion of forces—and for localization of function. Their processes of life must stand in direct relation to the development and manifestation of psychical life. We have fibers, the grey commissures or tracts, conducting the nerve forces whereby relations between the different ganglionic bodies are maintained. These are the characteristics of the grey matter in all parts of the nervous system. The picture of the psycho-physical organism presented in the diagram, refers only to those located in the grey cortex of the convolutions, where a great number of such organisms are supposed to exist, being of different order and significance, according to their direct or indirect dependency of and relation to each other and to the central expansions of the nerves of sensation in the grey cortex, of which, for the sake of simplicity, the special sensory nerves only are marked out in the picture.

Under normal circumstances all tracts and centers outlined in the figure are presumed to be in operation, and this full co-operative mental activity represents in the life of man the state of being conscious of individual existence. The question is, what would be the effect of an interruption in one or other of the tracts delineated in the figure? This is a perfectly legitimate inquiry inasmuch as we are daily witnesses of one phenomenon which points towards an interruption somewhere in this organism, whereby man is rendered unconscious of his existence for about a third of his lifetime. I mean sleep. An examination of the figure and a consideration of all the phenomena connected with sleep will at once disclose the seat of this periodical interruption. Communication with the external world is not entirely interrupted during this condition, as there is a prompt response to all kinds of sensory irritation. Dream-life with its accompaniments shows, furthermore, that the whole organism above the centers of perception remains intact. Recollection of ideas and their associations, memory, imagination, reason, emotions, attention, will,—these may all come into play in a dream. Moreover, we have conclusive evidence of the existence of a stimulation of the three upper circles from the perceptive centers, since the effect of light on the closed eye, of a sound, a touch, etc., upon the production of dreams and their course are a matter of universal experience. The tracts, therefore, between the perceptive centers and the circle of the formation of ideas, remain as the only possible seat of this breach of continuity. This seems to be in entire conformity with all the facts observed, since all perceptions which take place during sleep, are apparently not recognized as an existing reality, that is, they are not combined with their corresponding idea, and as soon as this is

perfected, sleep vanishes and the consciousness of individual existence in relation to the external world is fully regained. The processes by which this periodic interruption is effected, and especially at the point in question, is still a mystery. Yet, the chemical theory of sleep, as it might be called, which associates the two opposite states of waking and sleep with changes in the nature of chemical processes in the grey cortical ganglia, or with the constant changes in the proportion of the two different processes of accumulation (of intra-molecular energy) and dissociation, may afford the basis of a future explanation. The changes in these processes seem to be directly dependent upon the presence or absence of inward impulses and upon variations in their intensity. Those of dissociation prevail under the full operation of inward impulses, during waking, those of accumulation when these impulses are disappearing or cease, as during sleep. As far, at least as the actual relation of the individual to his surroundings is concerned, the correctness of the explanation given, will not be gainsaid. The phenomena of physical and psychical fatigue and exhaustion, it is true, point also to influences of deeper origin and the existence of causes which may independently produce the changes referred to, yet this does not reduce the importance of the former, as it is nothing more than an instance of the reciprocity of causes and of phenomena found everywhere in nature.

An interesting case, proving the correctness of the theory advanced here, has been recently given by Dr. Strümpell, of Leipzig,* which is worth quoting in full:

"In autumn, 1876, there was received into the Medical Clinic of Leipzig, a youth aged 16, in whom various phenomena of anæsthesia gradually developed themselves, to an extent which has very rarely been observed. The skin of the whole surface of the

* Pflüger's Archiv. für Physiologie, Vol. xv, p. 573.

body was completely insensible, and that in respect to every kind of sensation. The most powerful electric current, or a burning taper held to the skin, was not able to produce any pain, or even a sensation of touch. Almost all the accessible parts of the mucous membrane of the body exhibited the same insensibility to pain. Also, all those sensations which are classed together under the name of 'muscular sense,' were entirely absent. The patient, when his eyes were closed, could be carried about round the room, his limbs could be placed in the most inconvenient positions, without his being in any way conscious of it. Even the feeling of muscular exhaustion was lost. In addition, there came on also a complete loss of taste and smell, amaurosis of the left eye and deafness of the right ear. In short, here was an individual whose only connection with the outer world was limited to two doors of sense—to his right eye and his left ear. Moreover, both these remaining doors could at any time be easily closed, and in this way it was possible to investigate the consequences of completely isolating the brain from all external stimulation through the senses. I have frequently made the following experiment, and often showed it to others: If the patient's seeing eye was bandaged, and his hearing ear was stopped, after a few, usually from two to three minutes, the expression of surprise and the uneasy movements which at first showed themselves, ceased, the respiration became quiet and regular; in fact, the patient was sound asleep. Here, therefore, the possibility of artificially inducing sleep, at any time, in a person, simply by withholding from the brain all stimulation, by means of the senses, was realized. The awakening of the patient was as interesting as the sending him to sleep. He could be awakened by an auditory stimulation, as, for example, by calling into his hearing ear, or by visual stimulation, by allowing the stimulus of light fall upon his seeing eye, but he could not be awakened by any pushing or shaking. If he was left to himself, he did eventually wake up of his own accord, in course of the day, after the sleep had lasted many hours; the awakening being due, it might be, to intrinsic stimuli, started in the brain, or it might be to slight external unavoidable stimuli, acting through his still functional sense organs, and making themselves felt, in consequence of the sensitiveness of the brain being increased during the repose of sleep."—(*Nature*, December, 1879).

Let us now consider another phenomenon of psychical disturbance of every-day occurrence, namely, intoxica-

tion. Every one who has either had individual experience, or who from close observation of others, knows that the first effect of an overdose of alcohol is a diminished sensibility of all the senses or of the perceptive powers. This goes hand in hand with an increase of activity in the inner parts of the nervous organism in the grey cortex of the brain, which presents itself as a state either of exalted or depressed commotion and is always followed by a decrease, and finally an entire arrest of all psychical manifestations. The interruption in the beginning evidently concerns, therefore, all the direct tracts in the figure which run out from the perceptive centers, although these are probably never entirely isolated. In the further advanced conditions the interruption spreads gradually out over all the tracts in an upward line. At first there is a decrease in the formation of ideas; then memory begins to fail and the associations of ideas become disturbed. Later on imagination governs reason and judgment, and after the separation of these, emotions or a sudden arrest of attention may incite the will, and the strangest and most unexpected acts may be committed, before the whole organism comes to a stand-still. The condition in chronic alcoholism is in perfect accord with this picture. The affection extends over the whole central nervous organism, all the connections are impaired and loosened, and herein lies a distinction between this condition and insanity.

Suppose now that in a given case the main tract between the circles of reason and of will is interrupted. According to the opinion, expressed in the foregoing, of the existence of numerous or diffused nervous organisms, of the kind described, in the grey cortex of the brain, this supposed separation of reason and will must of course not necessarily be understood as universal. Here

it has sole reference to a special matter which predominates in the mind; as no one can serve two masters at the same time. In this case the stimulation of the will would entirely depend upon, and be governed by, impulses from the center of memory and the association of ideas, the center of the formation of ideas and the different centers of perception. By excitation, therefore, from the lower centers, the will could be incited to any abrupt action, which would have for its only controller and regulator the influence of the facts of memory and mental association. Yet, even the latter connection may be suspended, and the will thus become the plaything of each rising idea, or even be induced to action by a single sudden perception.

In the first case, therefore, the impulses from the circle of ideas and directly from the perceptive centers are only in so far identified, as they are facts of memory, or as they may be connected with mental associations at immediate disposal. In the second, however, they are apt to be entirely misconceived from the beginning. This, of course, refers to the identity of persons as well as of things, and of every kind of sensual impression. Both conditions are characteristic of primary insanity, and there is frequent occasion to follow up in the progress of the disease the transition from the first state into the second.

Suppose, in another case, the main tract between the circles of memory, etc., and of reason be interrupted. Here the only impulses which would reach the latter would proceed directly from the circle of ideas and the centers of perception. Reason itself would thus be made the puppet of these latter, and the will, under its control, would display incoördination in all its manifestations, only exhibiting the influence of method as long as there exists a direct stimulation through the still

unimpaired tracts from the circle of memory and mental association. The simultaneous interruption of the latter would render the incoördination complete and the abrupt and isolated operations of imagination and reason become the source of delusions and illusions. Both conditions are, as is well known, elementary phenomena of insanity. Their symptomatic significance, as well as that of the two above described, must be considered dependent upon the rank and order and perhaps the number of the nervous organisms thus affected.

We proceed to cases in which the main tract between the circles of ideas and memory and mental association is supposed to be the site of an interruption. In these cases the higher centers in the organism would remain almost entirely unimpaired in their operation. Yet the ideas conceived, would not form part of the facts of memory and mental association, but be directly transmitted to the centers of reason and will, and there induce an independent stimulation. They would appear more or less isolated, out of place, and apt to be apprehended as something unreliable and dubious. If the interruption extends over the direct tracts between the circle of ideas and those of reason, a feeling of an entire uncertainty of things, associated with fear and anxiety, would be engendered. And in the event of complete separation from the higher centers, the nervous organism would approach a dream-like condition, with the senses active, with a perhaps correct exercise of reason, yet without true appreciation of facts concerning the relation of the individual to the external world. The direct impulses from the perceptive upon the higher centers would not be correctly identified, and thus become the source of innumerable errors and the cause of hallucinations.

It is not my intention here to discuss this matter in detail, and to go through all the varieties of interruption of the tracts which could possibly be supposed to occur, or to exhaust the subject in any way. This would involve the necessity of a much more complicated figure, if not an entirely different arrangement. It is here merely attempted to represent the inward psychical tracts, without any reference to motor phenomena, not even those expressed through the organ of speech. I have also purposely avoided citing special illustrations, etc., since the time for the application of such a method of demonstration in Psychiatry has not yet arrived. The sole object was to show, at least, the possibility of explaining phenomena, so familiar to us and yet so veiled in mystery, by simply applying to them the same principle which holds good in the physiology and pathology of the nervous system in general.

The most important task, of course, remains unaccomplished, that is to furnish proof, from direct anatomico-pathological investigations, of the right to apply the principle. In this connection, indeed, only very little can at present be offered, yet perhaps just enough to justify the attempt here made.

I have stated above that in cases of acute primary insanity, next to the lesions, observable in the vascular system of the brain, palpable changes in the ganglion cells of the grey cortex, themselves, had been discovered. These changes concern, first of all, the basal prolongations of the pyramidal cells which, as described in a former article,* undergo a process of coagulation or gradual contraction, until they may disappear almost entirely, and assume the appearance of small, knobby protuberances of the protoplasmic body of the cell.

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* Am. Journal of Insanity, January, 1881, p. 285, ff.

This peculiar change in the cells seems to be of interest from more than one point of view: On the one hand, in so far as it concerns the protoplasmic terminations of the cells toward the points of the central expansions of the nerve-fibers in the same districts of the grey cortex; and on the other, as the character of the change seems to indicate a breach of continuity or of the intimate relation between the two important elements in the nervous organism, the cells and the fibers which are destined to act upon each other. This coincidence of circumstances apparently constitutes what we desired to demonstrate, viz.: an actual interruption in the nervous organism concerned in mental operations at a most important point. This, it is true, is a single fact, which can not yet be placed in proper relation to any phenomena of a distinct and defined nature, but it is nevertheless of constant occurrence, and at present of unlimited significance.

It would appear to be incumbent upon us in future to keep a record in each case of the convolutions in which ganglion cells thus affected are found, to note the class of cells and, as far as possible, the extent to which they are involved. Every one, however, familiar with this kind of research will acknowledge the difficulties of such an undertaking. We have at first to deal with a tissue of such natural softness, and which is, like all soft tissues, so easily decomposable, that we are either compelled at once to employ chemical solutions, which prevent their decomposition and render it more solid and more easily manageable, or we must immediately undertake the examination of the fresh tissue by using all precautionary measures to keep the specimen as long as possible in an unchanged condition. This last method, described in the article before cited, seems to promise by far the best results. Yet

only in a few cases have I myself been able to carry the examination entirely through to my own satisfaction.

No important conclusions, it is true, can be drawn from the facts of a few examinations, even though complete. It may be said, however, that the results thus far obtained, although in conformity with the localization of disease, do not sustain the theory of localized psychical functions in the brain, which would place the different faculties of the mind in different sections of its organ. Nevertheless, it is a matter of fact that the cerebral convolutions are not all of equal significance in their relation to psychical processes, but this disparity refers solely to the nature and the order of these latter, and not to supposed faculties of mind. Thus the facts of pathological topography seem distinctly to support the division of the surfaces of the hemispheres into at least three sections of different order. These are, first, a pear-shaped section, embracing the temporal, the occipital and the parietal convolutions; secondly, a triangular section composed of the central and praecentral, and thirdly, a hemispherical section, formed by the frontal convolutions. As regards the nature and signification of the nervous organisms located therein and concerned in mental operations, they would follow in a line drawn from the temporal and the occipital to the frontal development of the organ. The first section, apparently, embraces the districts in which the first central terminations of the sensory nerves are situated, that is where the central organism of mind enters into direct relation with impulses transmitted from the peripheral expansions of the nervous system. In regard to the second section the correctness of the interpretation, whence it has received the name of the motor area of the brain, is more than doubtful; at least, it throws no

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light upon the nature of any psychical processes connected with operations in these parts of the organ. From pathological observations, it can not be questioned that lesions situated in this section are commonly associated with severe psychical derangement. Yet the application of the right measure to special phenomena of this kind is still a problem, however not incapable of solution, as opposed to others, connected with it, the solution of which will perhaps ever remain impossible.

CASE OF EXTRA AND INTRA-CRANIAL CARCINOMA.

BY M. M. BAGG, M. D., UTICA, N. Y.

F. G., aged 13, was received into the City Hospital, at Utica, July 9, 1879, having a tumor on the head, posterior to and somewhat to the left of the vertex. His mother was then in an advanced stage of phthisis, and has since died; his father died of Bright's disease, and his father's father, as it is said, of tumors, that were thought to be cancerous. The boy himself had been tolerably healthy until about three months previous to his admission, when he suffered for about ten days from intense pain in the head. This afterward subsided and left him, for a time, in apparent health. For a single day, he was employed by a druggist in mixing dyes, including picric acid and other poisons, from which employment he returned home quite sick, with vomiting and renewed pain in the head; and was soon afterwards taken to the hospital. When received, there was a swelling on the head, of moderate dimensions, without pain, heat or hardness—such a swelling

as might have resulted from a fall or a blow, and which was thought to be a simple inflammation of the scalp. There was, however, some obscurity of vision, and likewise general muscular pains of a rheumatoid character. The swelling gradually enlarged, extending towards the occiput, and showing no tendency to suppurate. At the same time the feebleness of vision increased till it ended in total blindness, and was accompanied by increasing deafness. The appetite was good, and the intellect unimpaired. An examination with an exploratory trocar, revealed nothing but a little blood, as was true also of a freer incision with a bistoury, made a few days later. The blood was probably superficial in its source, the veins being considerably enlarged. The tumor continued to extend downwards and laterally, and at the same time there was protrusion of the eyeballs, which proceeded to such an extent as eventually to terminate in ulceration of the external coats of the eye. This marked exopthalmos, with the very great impairment of the function of hearing, while the mind remained clear, led to the suspicion of a double tumor, an anterior intra-cranial one, coincident with that upon the scalp, especially as it could not be discovered that the skull was anywhere perforated by ulcerations, so as to make one of the tumors a continuation of the other. This was, however, not confirmed by the autopsy. The increased weight of the head caused the patient to support the forehead upon a table, this being a more comfortable position than a recumbent one, partly by reason of the pressure felt in lying down, and partly from a dyspnœa which now supervened, and which was ascribed to a swelling that had made its appearance upon the sternum, similar to the one upon the scalp, and which, like that, went on augmenting. Fever, by degrees, ensued, the appetite and strength failed, but

light upon the nature of any psychical processes connected with operations in these parts of the organ. From pathological observations, it can not be questioned that lesions situated in this section are commonly associated with severe psychical derangement. Yet the application of the right measure to special phenomena of this kind is still a problem, however not incapable of solution, as opposed to others, connected with it, the solution of which will perhaps ever remain impossible.

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though devoid of pain from the time he entered the hospital, except the general muscular pains above mentioned, with his mental faculties unobscured down to within forty-eight hours of his death, and without spasm or convulsion, he gradually declined, and died on the 6th of November.

An autopsy was made thirty-six hours afterward, by Dr. Deecke, Pathologist of the State Lunatic Asylum, assisted by several physicians of the Asylum and the city.

The dimensions of the tumor were as follows: From the root of the nose to the occipital protuberance, 19½ inches; length over tumor, posteriorly, from ear to ear, 15½ inches.

Removal of the integuments disclosed a flattened tumor of a yellowish white color, fatty appearance, and soft cartilaginous consistence, which covered the whole posterior head. This was dissected from the skull and downwards to its base in the lower occiput, where on its inner surface there was found considerable pus with ulceration and softening of the occipital bone. On removing the calvaria, it was discovered that the tumor had penetrated the bone and invaded the left posterior and lateral portion of the dura mater, where it adhered firmly to the skull. After removal, it presented a tumor or rather a series of tumors on its left inner surface covering the brain to the extent, horizontally, of three and a half inches from the posterior portion of the left upper parietal convolution into the temporal lobe, and, vertically, of three inches from the third temporal convolution upwards into the second parietal. The tumors were not in any way attached to the arachnoid and the pia mater, and not connected with the substance of the brain itself. The surfaces of the convolutions were, however, destroyed from atrophy caused

by the pressure of the tumor upon them. The convolutions involved were the following: The middle and the posterior portion of the third, second and first temporal convolutions, the second and first occipital convolutions, the gyrus angularis, the posterior portion of the gyrus supra-marginalis and the posterior portion of the upper parietal convolution, all on the left side. The tumor was a soft carcinoma of a wide meshy stroma, the latter being most prominent at the inner leaf of the dura mater, where it was consequently of a much softer consistence. Here it was exceedingly vascular and had been apparently of rapid growth. The other parts of the brain were throughout normal.

The protrusion of the sternum was not due to the presence of a tumor, but to a decided anterior dorso-lumbar curvature of the spine. The cartilage was thickened, however, and microscopic sections showed abundant cell infiltrations.

The case is of interest in many respects, from its rarity, the obscurity of its origin and the difficulty of diagnosis, from the presence of pain in the beginning and its absence afterward, from the renewed proof it gives us of the relation between phthisis and cancer, and the seeming relation of both to rickets, Pott's disease and other dyscrasia, from the resemblance of the case of the boy to that which is reported of his grandfather. Though detected at first on the skull, and thence apparently extending inward, it was doubtless from the outset a disease of the whole system, and fixed itself simultaneously upon the scalp, the long structures and the brain, selecting these localities in preference to those internal viscera which cancer more frequently invades. The poisonous effects of the handling of dyes a month before his admission can scarcely be thought to have had any influence in causing the disease, how-

ever it may have temporarily depressed the sufferer. And yet it may not be amiss to mention that the ejecta thrown off on the evening of the day he worked in the dyes are said to have been deeply discolored, as were also the secretions from the nose, as seen on his handkerchief for several days afterward, and that when admitted to the hospital he was believed by his mother and family to be under the influence of poison.

An interesting feature of the case is furthermore presented in the relation of the destroyed surfaces of the convolutions of the brain to the symptoms in the sensory sphere during the progress of the disease. There was no noticeable impairment of the ordinary intellectual faculties, yet a gradual failing of the powers of vision and hearing, which resulted in total blindness and increasing deafness. The destruction of the surface of the convolutions embraces, as will be seen from the description given above, the region of Ferrier's so-called perceptive centers of the sense of sight, and the lower portion of that of hearing, and also the cortical districts for the power of vision and hearing as designated by Munk. The lesions in this case were, however, confined to one side of the brain only.

OBSERVATIONS ON THE CRANIUM AND BRAIN OF A HYDROCEPHALIC PATIENT, AGED NINETEEN YEARS.

BY PROFESSOR A. TAMBURINI,
Director of the Asylum for Insane of Reggio, and of the Psychiatric Clinique of the University of Modena. 1881.

The cranium and brain about to be described belonged to a hydrocephalic male, who died at the age of 19 years, in the end of March, 1880, in the vicinity of the Asylum of Reggio.

The little which could be ascertained as to the history and the functional state of the parents, from the physician who had seen him several times during life, and from a short visit made by us a few days before death, may be reduced to the following detail:

F. S. was born in 1861, of healthy and robust parents, who had other children, healthy and well organized. The mother remembers no notable circumstance in the period of her gestation of F. S. At birth, according to the statements of the parents, the cranium was of normal dimensions and form, and he had commenced to walk when one year old; his intelligence appeared to be regularly developing. At the age of two years the parents first observed that his head had commenced to enlarge, especially in the frontal region, and gradually to become heavier, so as to drop towards the chest, and to render walking difficult.

At the age of five years, when the distinguished Dr. Bonasi, medical adviser of the village, who called our attention to this important case, visited him for the first time, he found him with the cranium already of nearly the present size, the vertebral column distorted, as will

be hereafter described, the muscular structure slight, but far from that general atrophy in which we found it shortly before death; he then still preserved a certain capability of movement of the lower limbs, and could also walk a little, though with much effort. The head, however, was still drooping, so that his parents, keeping him always in a sitting posture, procured for him a sort of supporting frame for the head, which they had gradually increased in height according to his growth. The mental faculties proceeded in observable development until his seventh year, when they remained stationary, so that he afterwards had not much more intelligence than a child. Speech, which had begun to be developed at one year old, was arrested at his fifth year, or rather became deteriorated. His sight, after his thirteenth year, gradually weakened; strabismus appeared; and first, at intervals, afterwards continuously, nystagmus.

At the age of eight years, from falling down stairs, he had a severe wound on the left region of the head, with fracture in the fronto-parietal portion of the skull, which was almost immediately followed by convulsive movements of the limbs, especially on the right side, and most markedly in the upper ones. He continued very ill for twenty-five days, but the convulsive movements ceased after the first day. From this time onward the motility of the lower limbs became so much enfeebled that he was incapable of walking, even when held up. Three years later, from a second fall, he sustained a wound in the same region, and the convulsive seizures again occurred, and continued till his eighteenth year, when they disappeared, but were followed by general contracture of the limbs.

When we visited him, we found him sitting; his head was very large, and was bent down, and sup-

ported on a sort of scaffold placed in front of him. His physical condition was reduced to the lowest extremity, so that a complete, objective and functional examination was impossible; however, from the examination made by us, in association with the distinguished Drs. Riva, Seppilli, Buccola, Venanzio, and Altana, and from another made by Dr. Venanzio at another visit, we were able to collect the following *data*, from which we exclude those relative to the cranium and the skeleton and general frame, which will be reported in the autopsy.

Objective Examination.—The emaciation is of the highest degree; the *musculature* atrophic; the skin all over very pale; the abdomen much depressed; many eschars and phlyctenæ on those parts which had been in contact with outer substances; œdema of the hands and forearms, and of the lower limbs.

Voluntary movement in the lower limbs and the whole of the trunk, is absent, but is yet preserved, though much enfeebled in the upper limbs. The limbs are, however, in a state of permanent contracture. The sterno-cleido-mastoid of the right side is contracted, and the face is turned to the left, with the head inclined towards the right shoulder. The mouth is held half open, and the saliva flows from it. The right eye is divergently strabismal; the ocular bulbs are turned much downwards, and are permanently held in this position. It is impossible to elevate them; they are usually turned towards the right (in conjugate deviation), and frequent nystagmus is observed. The dolorific sensibility is tardy, but is still present; the tactile can not be estimated with exactitude, because of the grave condition of the patient. Vision is imperfect, hearing is sufficiently normal, and so are the other senses.

Spontaneous mental extrinsication in the present state is almost *nil;* yet from the monosyllables with which he makes feeble replies, it is perceived that he well understands the questions. As to the rest, so far as stated to us, though his intelligence has but a little exceeded that of childhood, it was yet of such a degree as to enable him to feel affection towards his family, and to comprehend that he was, in his misfortune, "their cross" (*la croce dei suoi*); he gave attention to whatever was done or said around him, and took part in the conversation, if not directly, in at least following the discourse and participating in the sentiments; for example, those of gaiety, when such aroused him. He was usually calm, tranquil and apathetic; he had no maniacal periods. The functions of nutrition were always sufficiently normal; the digestive forces were sufficiently energetic; defecation was rather difficult. Nutrition was of late much altered, and he labored under dyspnœa; his limbs had become œdematous. Respiration is heavy and rhoncal; the pulse small, and very frequent 130. He died on 25th March, 1880.

Autopsy.—Cadaver much emaciated, eschars and œdema in various parts of the body. Stature m, 1,580 (about 5 feet 3 in.)

The cranium very voluminous and throughout equally developed, but markedly so in the frontal region. The face, although fairly developed, yet appears as if hidden under the cranium. We shall hereafter give the measurements and the exact description of the cranium as observed after maceration. In the meantime we may say that we noted, on first view, vascular sulci, very superficial; that of the middle meningeal almost completely wanting on the left; the skull in some points very transparent, as in the frontal region and the right

parietal eminence. At other points some circular areas were observed, in which the skull appeared as if wasted away and reduced to a single osseous table, entirely deprived of diploë, along the coronary suture on the left, and in other points corresponding to cystic hernias of the dura mater. In the left fronto-parietal region, a linear empitment was observed, certainly corresponding to the old fracture, five centimetres long, crossing in an oblique direction the coronary suture, eleven centimetres distant from the sagittal, and describing a light semicircular line, with its convexity downward.

In the examination of the body, we observed the right upper limb more developed in length and size than the left; and so in length the inferior limb. In the vertebral column a hump and distortion in the cervical and dorsal regions; distortion with convexity towards the right in the cervical, and towards the left in the dorsal region. Curve in the lumbar region, in which the bodies of the vertebræ were directed towards the left and forward, so that they came very near to the anterior wall of the abdomen. We shall now give the description of the brain, as it appeared to us in the autopsy itself, and in the later examinations, in which Dr. Seppilli rendered valuable assistance.

Cerebrum.—The cranium having been removed, an abundant quantity of liquid escaped, at first sero-sanguineous (rendered so by the blood issuing from the cut vessels), afterwards serous. The two cerebral hemispheres, yet covered by the dura mater, appeared like a large bladder filled with a fluctuating liquid. The dura mater of the left hemisphere presented in the fronto-parietal region some large patches of tendinous thickness, and in correspondence with the wasted part of the cranium described, a small cyst accommodated

to it, which appeared to be the dura mater extruded at this part.

The dura mater being removed, which was detached with some facility, the two hemispheres, appearing much dilated, remained still full of their liquid, as two large fluctuating bladders, and on their surface the convolutions were seen to be distended, flattened, of enormous length and breadth, and with sulci very shallow. In the left fronto-parietal region, corresponding to the old fracture described, as also to the tendinous thickening and the small hernial cyst of the dura mater, we observed, over an extended area, almost circular, about seven centim. in diameter, the cortical substance had entirely disappeared, and there remained only a very thin covering, which appeared solely of the arachnoid and the pia mater, enclosing here the internal cavity filled with liquid. This extensive destruction of the cortical substance included a great portion of the *second and third frontal* in their posterior and external parts; the margins limiting the destruction presented a notable consistence. The surface of this membranous covering, as also for a certain extent that of the surrounding convolutions, was discolored by patches of a dull, yellow color. Similar patches were discovered here and there on the right fronto-temporal region.

The convolutions which appeared the most enlarged and distended, were those of the frontal lobe (excepting the third in its lowest part) and the central bordering on the fissure of Rolando; the parietal were also distinctly so, but those of the occipital and temporal little or not at all. The greatest antero-posterior diameter of the ascending frontal, on the right, was 45 mm., and on the left 30; that of the ascending parietal 32 on the right, and 34 on the left.

The fissure of Rolando was much to the rear, and had a length of 14 centim. The fissure of Sylvius was much elongated backwards, of little depth, and wanting its anterior branch; the convolutions of the *island* were small, much compressed, especially on the right. The pia mater was everywhere much attenuated, and was adherent to the cortical substance, from which it could not be detached without abrasion of the latter.

In removing the brain from the cavity of the cranium, there flowed from the lacerations of the attenuated and destroyed parts of the cerebral parietes, little by little, all the liquid, of which we were able to collect 1,630 c.c., and we might calculate at full 30 grammes that which escaped in the first opening of the cranium and the removal of the brain; we may therefore reckon at about two litres the liquid which this hydrocephalic cranium contained, and which was, for the greater part, held in this totally excavated cerebral mass, which formed merely the walls of a great bladder. The brain, when removed and almost completely emptied of liquid, weighed only 1,150 grammes. The corpus callosum was reduced to a very thin covering (*velamento*), which was lacerated with great facility, especially in its posterior part; anteriorly it was somewhat thicker. The corpus callosum being lacerated, we looked into two enormous bladders, which represented the cavities of the two lateral ventricles; these measured each (at the cerebral walls somewhat crushed) 250 millim. in length and 135 in breadth, and at the walls elevated and replaced, as when they were adapted to the skull, 185 mm. in their antero-posterior direction, and 78 in the transverse. On examining the various parts of these great cavities, it was seen that the dilatation was paramountly at the expense of the anterior cornua of the ventricles. In fact, while normally the corpora

striata are situated in the anterior extremity of the lateral ventricles, in such a way that the anterior margin of their head is ordinarily in immediate contact with the wall of the anterior cornu, or is separated from it by a space of hardly 5–10 mm., instead of which, in this brain, the corpus striatum was situate half-way in the length of the ventricle, so that between the anterior margin of the corpus striatum and the anterior wall of the ventricle, there was a distance of fully 8 centim., which therefore presented in all the enormous length of the anterior cornu.

The corpora striata were both of normal volume and form, but completely displaced from their proper direction; each of them, instead of having, as in the normal state, a direction longitudinal and almost rectilinear in antero-posterior relation, with the head touching the anterior wall of the ventricle, and the tail prolonged so as almost to touch the external margin of the thalamus opticus, had, on the contrary, a direction almost completely transverse, with a slight obliquity from within outwards, and from before backwards, the head bent inward and the tail outward, semicircularly, with the concavity inward and its extreme point nearly touching the external surface of the thalamus. The corpus striatum was coasted by a large blood vessel, which sent its branches almost perpendicularly from behind forwards.

The thalamus opticus was not, as in the normal state, in immediate contact with the corpus striatum and separated from it superficially merely by the striate cornua; the thalamus and the corpus were separated by a white substance, of a maximum diameter of two centim.,which, to the naked eye, appeared evidently constituted of fibres radiating as a fan from the thalamus towards the corpus striatum. The thalami were much smaller than

normal; the right was a little larger than the left, but quite consistent, with nodules of evident sclerosis of leathery firmness. The pineal gland was notably augmented in size, above double the normal, and was formed of a hard and compact texture. An equal hardness was observed in the bigeminal eminences, especially in the superior, where, on the left in particular, a cartilaginous consistence was apparent. All the sclerosed region, the upper wall of the right thalamus, the pineal gland, the commissure of the thalami as far as the aqueduct of Sylvius, and the superior bigeminal eminences, (also a small portion of the left thalamus,) presented on their surface a dull, reddish, yellow color, which at some points passed into coffee color. This deepened color was particularly noticed at the point between the internal part of the right thalamus, the pineal gland, and the right superior bigeminal eminence. There then existed an area of decided softening, where the cerebral substance was reduced to a pultaceous consistence, and by introducing, for a short distance, a probe, it was perceived to enter a sort of small cavity, containing a semi-fluid matter of gelatinous aspect and dark, reddish, yellow color. A stratum of gelatinoid substance of color analogous, investing the surface, was the material which gave the dark red appearance to the posterior part of the pineal gland and the other parts mentioned.

The middle cornu of the lateral ventricles, cornu Ammonis, was much dilated, and the pes hippocampi was greatly stretched; but no hardening was noticed. The posterior cornu was dilated, but much less than the anterior; this was the only part where there was, between the grey substance and the great ventricular cavity, a stratum of white substance of fair quantity; the point of the occipital lobe appeared, in comparison with the rest of it, thick and rather indurated.

The third, or middle, ventricle was considerably elongated, but narrower than normal, especially in its posterior part, in consequence of the two internal faces of the thalami being very close to each other. The arachnoid and the choroid plexus, between the two thalami, were much thickened, and of fibrous consistence. The anterior part of the fornix was thickened, and the septum lucidum was notably increased in volume. It is also to be noted that while the point of descent of the anterior pillars is ordinarily on a level with the anterior extremities of the thalami, in this brain, on the contrary, it is on a level with the head of the corpora striata; so that it may be said that while these bodies had undergone a separation in their posterior ends, the pillars remained in their true position. Their origins, however, did not proceed exactly around the internal margin of the thalamus, to their descent into the middle cornu, to reach the mamillary eminences, but were expanded in fibres, as a fan, between the corpus striatum and the thalamus. The whole ependyma investing these parts was evidently thickened and granulous. There did not exist any trace of the middle commissure.

On the base of the brain it was seen that the chiasm of the optic nerves was formed of minute cords, very slender, and the X of the chiasm was much splayed transversely; the small bands were very slender. The olfactory nerves appeared normal, and they followed their continuation well to the convolutions of the hippocampus. The other cerebral nerves appeared normal. The tubercinereum and the mamillary corpuscles were very small. The cerebral peduncles were much elongated in the parts nearest to the hemispheres. The pons Varolii was very small, and so was the medulla oblongata, especially below the olivary bodies,

which were distinctly developed. The arachnoid and the pia mater, which involve the inferior portion of the medulla oblongata, were of an obscure grey color. The fourth ventricle was not at all distended.

In trying to pass a probe into the aqueduct of Sylvius, both from the fourth and from the third ventricle, we could not penetrate, though it is very easy to do so in normal brains. This aqueduct was equally impervious to the passage of water in either direction, while it is easily accomplished in any normal brain. This fact leads to the conclusion that the aqueduct was morbidly closed.

The cerebellum presented nothing abnormal on its surface.

The thickness of the grey substance of the cerebrum was in all parts normal; the dilatation was wholly at the expense of the white substance. The thickness of the upper skull varied from 3 mm. to 20; it was greatest in the occipital region, and least in the frontal and parietal; the bone had totally disappeared in the area of destruction before mentioned.

The sulci between the convolutions were deepest in the occipital (11 mm.); less so in the parietal (6 mm.); and still less in the frontal (5 mm.)

On cutting into the basal ganglia, we observed as follows: The intraventricular nucleus of the corpus striatum was reduced to a broad stratum, very thin, 1–3 mm.; in correspondence with the head of the corpus striatum, only, did the thickness of the grey substance approach the normal. Below this very thin grey stratum the internal capsule was seen, also reduced to a very thin white stratum; next the lenticular nucleus, somewhat thick, but much elongated; and then the external capsule also thin, the nucleus of the tænia much elongated, and finally the white substance be-

tween the nucleus of the tænia and the cortex of the island much attenuated.

On making incisions into the right optic thalamus, it was seen to be formed of a very resisting texture, and of a grey color; the left was less consistent, and of a pale rose color, from an apparent diminution of the internal grey substance.

On cutting the bigeminal eminences, it was observed that the nodules of induration were formed of a texture of lardaceous aspect. The pineal gland, being cut in the middle, appeared nearly circular, in diameter 11 mm., and formed of three concentric layers—one external, pale and less consistent; one intermediate, darker, and one deep, whitish, very consistent.

The medulla spinalis presented nothing abnormal, save a slight dilatation of the central canal corresponding to the lumbar enlargement. The central grey substance was well developed and formed, through the whole length of the medulla. The rest of the autopsy showed nothing abnormal, excepting hypostasis and œdema of the lungs.

The microscopic examination of the brain, by Dr. Seppilli, showed scarcity of the ganglion cells in the grey substance of the frontal convolutions; in these and in the central also, the nuclei and nucleoli were rather indistinct. The size of the cells was small, particularly in the frontal region. The nuclear and connective substance abounded everywhere.

(*Note by the Translator:* Prof. Tamburini now gives very minute details of the capacity and measurements of the cranium, which, though very creditable to the industry and exactitude of the learned gentleman, Dr. Amades, by whom they were ascertained, we do not regard as essentially important for a proper under-

standing of the pathological and psychological merits of the case; we therefore, desiring to devote our available space to the more interesting portion of Prof. Tamburini's valuable article, pass forward.)

"This large head is particularly notable for the development of the cranial part, which, enormous, spheroidal, and overhanging the face in such a manner, (although this part is not small,) threatens to suffocate it. The cerebral cranium, on external inspection, appears in every part globose, it is symmetrical, if we note only a length somewhat greater in the oblique diameter, between the right frontal projection and the left occipital. A fact worthy of notice is that the extraordinary extension of the brain-case was not furnished almost entirely, as usually happens even in slighter cases of hydrocephalus, by an amplification and outward curvature of the squamous parts, (frontal, temporal and occipital,) and by duplex sutures of these, with the parietal, and ossicula Wormiani, but rather by a very great extension which had taken hold of all the bones, and in a preponderating manner the frontal and parietal. This fact led us to believe that the hydrocephalus had commenced before the period assigned to it by the family. The capacity of c.c. 3,090, and the other measurements give the idea of great volume. The general form of the cranium differs widely from common, by its notable rotundity, which, by augmenting the transverse and vertical diameters, renders it ultra-brachycephalic, and excessive in height.

The frontal bone proceeds from a large base, but not much beyond the ordinary, it rises perpendicularly, and is symmetrical, with delicate superciliary arches and distinct projections, and it bends backwards with a gentle curving on its middle, while at the sides it expands much, giving place between the belly and wing to a very perceptible bulging, especially on the left. The parietals are much extended, convex and rounding, with full protuberances and a rather marked antero-posterior curvature. The temporal squamous portions but little exceed the normal; they are flat and slightly sloping from above downwards and inwards. The mastoid epiphyses are of great size, and are rough and without trace of the squamosa-mastoidean suture. The great wing of the sphenoid was much extended, especially in height.

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The sutures were open, except in the vicinity of the sagittal, and were generally very simple; part of the coronal, however, was complex, and had long and slender teeth.

The muscular insertions were very little indicated, and from this appearance and the delicacy of the orbital border of the forehead, the cranium had the appearance of that of a young woman."

(NOTE.—We pass over a few paragraphs devoted to measurements and comparisons, which are not essential to an adequate comprehension of the case.)

The special interest of this case is presented in the fact that the life of F. having been prolonged to his twentieth year, we are enabled to depict with exactitude the alterations of development, form and direction, which the distension, produced by the hydrocephalic liquid, has induced in the various parts of the brain; and in the additional fact, that there remained the traces of other alterations, which, with the greatest probability, had a great part in the primordial pathogenic process, productive of the hydrocephalus. In fact, all the alterations met with in this brain may, in my opinion, be divided into three categories:

1st. Those which were the effect more or less direct of the distension produced by the liquid exudate.

2d. Those which very probably represented the posthumous results of the primitive alteration which produced the hydrocephalic process.

3d. Those which represented complications that more or less contributed to the principal morbid state.

1st. To the first category belong the enormous dilatation of the lateral ventricles; the thinning away of the cerebral mass, with disappearance of the oval centre, to such an extent as to form merely the thin walls of a great bladder; the considerable length and flattening of the convolutions, especially the central and the frontal, and the shallowness of the sulci; the

abnormal position and direction of the corpora striata, and their distance from the thalami; the attenuation and elongation of the grey and white strata which run from the corpora to the insula, etc. All these alterations found their direct cause in the enormous distension which the parts must have gradually undergone, as the liquid was being effused into the ventricle—a process ending in the usurpation of the whole hemisphere. This dilatation, however, was not equal in all the sections of the cavity; it was undoubtedly paramountly at the expense of the anterior section of the ventricle, and precisely of the anterior cornu. This is proved by the enormous distance (over 8 centim.) at which the anterior margin of the corpus striatum was found from the anterior wall of the ventricle, the considerable volume acquired, through distension, by the convolutions which constitute the frontal lobe, the greater thinning of the cerebral walls in the frontal region, and also the proportional greater development of the anterior section in comparison with the median and the posterior of the cranium. It is, therefore, necessary to admit, either that the pressure exerted by the effused liquid acted specially against the anterior part of the lateral ventricle; that is, from behind forwards, or that, acting with equal force on all parts of the ventricle, it found the anterior parts of the brain and the cranium more yielding, or that both these circumstances concurred to favor the greater distension in the anterior part. It is necessary to give an analogous explanation also of the singular splaying of the corpora striata, both as respects their relative position and direction to each other, and to the optic thalami. This anomaly of position, which we have before described, can not be explained unless by admitting that the corpora had been acted on, in a continuous and uniform

manner, by a force from behind forward, which, distending thus the base of the brain, forced these bodies to widen out from the thalami, and being carried forward thus causing the tails of the corpora to turn forward and outward, so that instead of the direction which they normally have, almost rectilinear (slightly oblique from within outward), they came into the almost transverse direction presented by them.

All this leads us to hold that the exuding liquid had acted in a postero-anterior direction in the distension of the cerebral walls; and thus obliges us to admit:

(*a.*) That if the exuding surface was limited, it was in the posterior part of the ventricles, rather than in the anterior;

(*b.*) That the anterior and posterior regions of the brain were found in different conditions of distensibility—greater for the former than for the latter.

Let us see whether in the facts of the second category we may find confirmation and explanation of these corollaries.

2d. To the second group should appertain all those alterations which, while they do not at all appear as effects of the distension produced by the liquid, on the other hand carry the traces of a slow irritative process, which may have been the cause, more or less direct, of the very abundant exudation. These are: the thickening and the granular appearance of the ependyma which invests the thalami, the eminences and the pineal gland; the sclerosis of these parts; the gelatinoid stratum of dark, yellowish red color, which covered several of these parts, and at one part deepened into a true focus of softening; the constriction of the third ventricle; the closure of the aqueduct of Sylvius. We have here wholly a region limited by the base of the brain, offering analogous alterations; the thickened

ependyma, granulous and covered by an exudate mixed with residua of old hemorrhage, which appeared more evident in the excavation between the right thalamus and the pineal gland, where there was all the appearance of an old hemorrhagic focus; the sclerosis, with atrophy of the right optic thalamus, and hypertrophy of the pineal gland; the compressed cavity between all these parts—this is the third ventricle, squeezed and constricted; finally, below these the canal of communication between the third and fourth ventricles—the aqueduct of Sylvius—closed.

All these lesions are evident signs of a slow, prolonged, irritative process, or better to say, of an inflammatory process with hemorrhagic exit, of which all these parts must have been the seat. We have, in fact, the characteristic traces of it in the exudates, and in the connective hyperplasia (sclerose) as well of the ependyma as of the interstitial texture, from which proceeded the coarctation of the related cavity.

What part could this localized ancient irritative process have had in the production of the hydrocephalus?

It is generally held that the pathogenic process of hydrocephalus usually consists in a slow exudative ependimitis; now all the parts described offer manifest characters of this. It is, therefore, rational to admit that this had been the point of departure of the liquid transudation. But could a surface so limited give origin to an exudate so abundant as to produce, as happened in this case, a dilatation of the two ventricles so notable? Admitting a slow and continuous production of exudate liquid, from even a limited surface, we may comprehend how, in a long time, so large a quantity of it might accumulate. And this accumulation so abundant, and its dilating effects on the parts, may be so much the better comprehended when we consider the

fact of the closure of the aqueduct of Sylvius, as a natural consequence of the superficial and interstitial slow irritative process, of the parts which constituted its limits, and very probably it was diffused into the ependyma lining the aqueduct. If the inflammatory process, at the same time that it produced the copious transudation within the lateral ventricles, also produced, by means of hyperplasia of the interstitial connective and adhesive exudates within the canal itself, first its narrowing and subsequently its closure, it is natural that all the liquid which was furnished by the superficial transudation, being unable to flow out through the aqueduct of Sylvius, from the third to the fourth ventricle, and from the latter into the medullary canal, must necessarily be accumulated in the lateral ventricles, and must continuously distend their walls, until they become two great bladders filled with liquid. And that the distension should be much more felt in the anterior of the ventricles than in the posterior, was a necessary consequence of the different resistance which, at least in a remote period of the irritative process, the parts behind the corpora striata must have presented, when already there had been produced in these that sclerosis of texture which we met with, and which certainly prevented them from yielding to further distension. Though, however, everything conduces to the belief that the chief point of outset of the hydrocephalic process and of the consecutive lesions was the region of the base of the brain, which we found most altered and paramountly sclerosed, the idea can not be absolutely discarded that, at least in the early period of the process, all the ependymal surface participated in it and contributed to the production of the liquid.

The fact of the atresia of the aqueduct of Sylvius explains to us, also, the non-dilatation of the fourth ventricle and the medullary canal, except in the lumbar region of the latter, where there was observed a slight dilatation, which might very well be regarded as the effect of a distension produced by a certain quantity of liquid, which in the inception of the hydrocephalic process, when the aqueduct of Sylvius was yet pervious, had passed through it, but was not followed by any more after the closure of the aqueduct.

All yet offered has regard to the nature, and, presumably, to the seat of the morbid process that produced the hydrocephalus. Now arises the question: in what epoch of life did this process commence? Is it to be held that it was congenital, or must we give credit to the assertion of the parents, that it commenced only at the age of two years?

When hydrocephalus commences at an epoch somewhat distant from birth, that is, when ossification of the cranial walls has already, in part at least, set in, then distension of the cranial walls does not take place in a uniform manner, but the parts yet thinnest, those not yet completely ossified, yield most to the pressure of the liquid, and become distended and form prominences (bumps?) which completely change the form of the head; the squamous bones—the frontal, parietal, temporal, occipital—are those which give these deforming saliences; thus also the sutures, at the points where they have not yet become completely ossified, undergo distension, which afterwards, in the period of complete ossification, gives place to sutures much more complicated, and interrupted by ossicula Wormiana. On the contrary, when the hydrocephalus is produced soon after birth, and no closed sutures oppose any obstacle to the distension of the cranial walls, their dilata-

tion is uniform, and the cranium appears equally spherical.

Now it is undoubted that the cranium of F. presented rather the characters of this second form of hydrocephalus—that is, the congenital, or that of the early period after birth, since the development of the cranium was uniform, and there was only one point of complicated suture—in the coronal.

But setting aside any importance to be attached to the statement of the parents, who assured us that the head of F. did not commence to enlarge till after his second year, and that also before this epoch his intelligence and his senses proceeded in normal development, there is a certain other consideration to be entertained, which might prove that the assertion of the parents merited more credence than might be supposed under a strict application of the above specified general principles. When expansion by liquid occurs before the ossification of the sutures—that is, when the bones of the vault are separated merely by membranous spaces (fontanelles)—then the latter, and not the former, present the less resistance, and hence they widen and permit a notable divarication of the bones. But when, after cessation of the hydrocephalic process, there happens that which is called the cure of the hydrocephalus, or that, while the quantity of liquid exuded remains unchanged, the cranial walls gradually undergo the process of ossification, it thence happens that in the dilated membranous spaces, new points of ossification are most frequently formed; thus are developed supplementary bones—the Wormiana—which unite among themselves, and with the bones of the cranium. Now, in our case there was no indication, in the points of ingranation of the cranial bones, of divarications undergone, nor were there any ossicula Wormiana whatever.

There is still another consideration. We have seen how great was the distension undergone by the cerebral mass, how great the attenuation of the walls, how marked the consequent alteration of form, position, direction, etc., of many parts of the brain. All this shows that very strong must therefore have been the pressure which, from within outwards, the liquid exerted on the ventricular walls, in order to carry to such a point the distension, as finally to separate the parts from one another, not on the convexity, but at the base of the brain—the great basilar ganglia. Now, if a pressure so strong had acted centrifugally on the cerebral mass, when, in the early period after birth, no suture, no complete ossification offered any obstacle to the distension of the cranial walls, it is very natural that these would have felt much more than they did the dilating action of the liquid, and would have undergone a much greater distension, and much more proportioned to the distension of the cerebral mass than was found by us.

Without then excluding absolutely, that even before the epoch indicated by the parents, a certain degree of ventricular hydropsy may have been initiated, we should hold that the hydrocephalus, true and proper and so copious, was produced only when the bones of the cranium presented a certain resistance, and the sutures already solidified did not permit further divarication of the bones. Nevertheless, the cranium had undergone a certain degree of distension, as its uniform enlargement proved. This may be explained by admitting that the bones, either because the epoch in which the hydrocephalus was produced was not very remote, or because there was present in them a pathological process, (of which we may find the analogue in curvatures of the spinal column,) and they may not

yet have been completely ossified, may have presented a limited but uniform yielding tendency, which permitted the uniform enlargement of the cranium. Perhaps, too, the bones themselves did not remain free from irritative process of which the brain was the seat; this is proved by the premature synostosis of the sagittal suture, the spongy aspect of the bones (a certain indication of slow osteitis) in the apex along the median line of the frontal, in the wings of the sphenoid, in the sella turcica, in the mastoid epiphyses, and finally the augmentation in the number and calibre of the vascular foramina in various points of the cranium, especially in the frontal and the temporo-sphenoidal fossæ. These diffused and localized hyperplastic processes of the bones of the cranium in cases of hydrocephalus, have been before observed with some frequency.

3d. We have, finally, some complicating facts—lesions—which, as well by their nature as by the epoch in which they were produced, could not have had part in giving origin to the hydrocephalus, or at the most only an aggravating influence over it. We would speak especially of the lesions found in the left fronto-parietal region of the cranium, as well as the brain, which could certainly represent only the residua of the fracture suffered at the age of eight years, when F. fell down stairs. We, in fact, found in the left of the cranium, at the point where the superior temporal line meets the coronary, a solution of continuity involving the whole thickness of the bone, with ragged and thinned margins, half a centimeter wide in the middle, and continuing forward with traces of healing of the bone. In correspondence with this region, there was seen on the brain an extensive area in which the cerebral substance was completely destroyed, in

correspondence with the posterior part of the second and third frontal convolutions, and a portion of the ascending frontal, and in consequence the walls of the great ventricular bladder were here formed of only a very thin covering, constituted solely by the arachnoid and the pia mater, which at this point presented on their surface patches of a dark yellow color, having the aspect of old hemorrhagic spots.

The genesis of this cerebral lesion is easy of explanation. Whether by the direct and immediate action of the fracture, or by a slow inflammatory process with softening, undergone in consequence of this, the corresponding cerebral surface, already *per se* much thinned by the dilatation produced by the liquid, finally yielded, the margins were separated, and hence there remained that large solution of continuity in the cerebral wall, which was closed merely by the thin meninges. This rupture, or destruction as we should say, may be the more easily conceived, in this region, as this was one of the parts upon which, as we have seen, the pressure of the liquid was most felt, acting from the interior outward and from behind forward; and it is very natural that on walls so stretched by the dilating force of the liquid, either the immediate traumatic action, or the slower one, of consecutive softening, might readily have produced their rupture, and their emptying and destruction.

We have thus tried to explain to ourselves all the multiplex lesions which we found in this interesting hydrocephalic brain. It now only remains to us, in order to complete the study of the case, to bring into relation some of the principal symptoms observed during life, with the anatomo-pathological lesions discovered in the autopsy.

And first of all we have seen that the intelligence, despite the great pressure felt by the internal cerebral mass, and especially by the frontal lobes, was still neither of the degree of idiotism, nor even of absolute imbecility. He was capable of certain notions, conversations and affections, which though they made up but a limited and almost infantile life, yet permitted him to take part in certain social enjoyments. This fact is explained (and there is at the same time in it an additional proof of the doctrine,) on the principle commonly to-day admitted, that the principal seat of psychical acts is the grey cortical substance of the hemispheres. In this case, in fact, while the white substance was everywhere thinned away, in some parts absolutely gone, and the dilatation of the ventricular cavities was effected at the cost of the white substance, the grey cortical substance was, on the contrary, of a considerable thickness, and the convolutions, although not deep, were still well defined and developed in breadth.

We have seen that the fracture in the left fronto-parietal region was followed by convulsive movements of the limbs, especially on the right side, and chiefly by the superior; and by the convulsive movements which reappeared after the second fall with a wound in the same region, and lasted from his eleventh to his twelfth year, in which they disappeared, to give place to permanent contracture of the limbs. The explanation of these convulsive phenomena is easy, when we observe that the lesions produced by the fracture on the cerebral cortex, involved actually a part of the so-called motor zone, whose influence in the production of epilepsy is now placed beyond doubt.

The same lesion, which included the inferior part of the ascending frontal and a portion of the third frontal,

explains in like manner the fettering of speech, which constantly increased in his last years, since this includes exactly the center for speech—that from which emanates the motor impulse for the muscles serving verbal expression.

We ought also to note, without however attributing to the fact too much importance, that in this individual in whom there was complete paralysis and contracture of the lower limbs, paresis of the upper, less development of the left limbs, especially of the upper, we had the fact that while the corpora striata, although displaced and elongated, yet presented a conformation and texture apparently normal; on the contrary, the thalami optici were both diminished, and the right notably sclerosed. This observation might lead us to the same conclusion as another case, not long ago illustrated, (*Contributo alle Localizzazioni Cerebrali*, 1879,) in which there corresponded to a conspicuous atrophy and paralysis of the left upper limb, in continuation of an extensive lesion of the motor cortical zone on the right, no lesion of the corpus striatum, but a strong atrophy and sclerosis of the right optic thalamus; that is to say, the conclusion that the thalami optici are not estranged from motor function, but that they are in some relation with the motility of the limbs of the opposite side, especially of the upper ones.

Finally it deserves to be noted that, in spite of so great a permanent lesion (compression) of the cerebral mass, life was protracted up to the twentieth year. It is true that it is well known to what a degree the brain is capable of bearing lesions of slow course; it is also true that the cases of hydrocephalus of a medium degree, which permit continuance of life for a certain number of years, are not rare; cases are recorded of moderate hydrocephalus that became stationary, and

reached to the age of 50 years. Topinard speaks of an individual who, with a circumference of 87 centimetres, (say 36 1-2 in.,) reached the age of 23 years. This, however, does not set aside the fact that our case was one of great rarity, when it is remembered that already, at the age of five years, the volume of the head of F. was very nearly the same as we found it. In this case we can not but ascribe an influence, in the maintenance of life, to the fact that, by the closure of the aqueduct of Sylvius, the pressure of the liquid which was exerted on the hemispheric masses, those parts were withdrawn from dangerous action, which, as the fourth ventricle and the other regions of the medulla oblongata, are most essential to the accomplishment of the vital functions.

A CASE OF THROMBOSIS OF THE LONGITUDINAL SINUS.

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The interest of the following case centers in its clear clinical symptomalogy, and in the fact that the disease may be closely followed throughout its entire course. The autopsy comprises, in addition to the principal morbid conditions found, other data, which, with special reference to the question of localization of motor centers in the cortex cerebri, are not without significance.

C. W., the wife of a railroad switchman, æt. 41, is said to have been healthy up to the time of the present illness. She had never borne children or been pregnant. Although the patient was intellectually well-endowed, there was marked hereditary predisposition. Her paternal uncle suffered from profound melancholia and committed suicide, her brother was for many years a patient at Illenau, and was finally transferred to Pforzheim as a case of chronic mania. The patient's present illness began about eight days before her admission to our asylum. The only cause assigned by her husband was the news that they were to be transferred from the station which they had hitherto occupied (his wife's birthplace) to Mannheim. These wholly unexpected tidings came like a thunderbolt to the woman. She had never been away from home. She lived in St ——, amidst a circle of dear friends, and she was especially fearful that her weakly husband would not thrive under the new conditions, and that they were threatened with pecuniary losses. From that hour on all rest and sleep

were out of the question. The woman wept and wailed, and tried every means in her power to have the decree rescinded. Her sickly, easy-going, good-natured husband could afford her no solace. Her unrest rapidly increased, and there supervened periods of cerebral congestion and fearfulness during which the patient would conceal and protect herself, crying aloud "they are coming and want to move into our house, but we won't go." In her great anxiety she ran to the station officials for help whereby they might retain possession of their house. Delusions soon appeared. The patient asserted that the Pope was dead; that he had cut his throat. She became so restless and frenzied that it required several persons to apply the necessary restraint. Allowed the free use of her arms, she began at once to destroy. The fear that she would be compelled to leave her house always entered into her delirium and maniacal demonstrations. The motor phenomena soon became more violent, and finally impulsive without definite plan, (maniacal). The patient rolled about on the floor for hours at a time, kicked and cuffed indiscriminately, gnashed her teeth, made all sorts of grimaces and convulsively contorted her arms (epilepsy had never been observed previously). The patient was handed over to our asylum in this condition on November the 7th, 1879.

On admission, the patient evinces great outward restlessness and a blind, violent resistance to every approach. She mistakes the identity of all about her, constantly attempts to escape, makes no answers to questions, and utters only a few quite fragmentary unintelligible sentences. The features wear an expression of extreme anxiety. The pulse is full, 120; the face flushed; the head warm. General nutrition is good, and the body well supplied with fat. Nothing remarkable in shape

of head. No disturbance of innervation. More exact physical examination is impracticable. On inspecting the body, the skin of both legs, particularly the left, and more especially that over the crests of the ilia, presents numerous fresh suggilations. The patient is put to bed and ice bags are ordered.

November 8.—Patient did not remain in bed in the night, notwithstanding a nocturnal enema of a gramme of chloral with 0.015 of morphia; she stood constantly at the door, rattling and trying to get out. In the morning, after the cautious inhalation of a few drops of chloroform, she became quiet for a few hours. Still utters disconnected sentences, from which is gathered that she does not know where she is and wants to go home at any price. Expression not so anxious as yesterday, head not so warm, pulse remains frequent; takes milk.

November 9.—Same condition. Constantly stands at the door and tries to get out, saying she will not remain here any longer; that she wants to go home; will not keep her clothes on; withdraws her hand when the attempt is made to feel her pulse, and cries continually, "No, no;" pulse 120. She gives to questions broken, unintelligible, dreamy answers. On account of her restlessness and constant attempts to get away, and fearing the danger of exposure to cold and exhaustion, the patient is restrained in bed by means of a strap.

November 10.—Much quieter to-day and at times more lucid. Complains that she can not go home, and that she has no more clothes; says that her money was taken from her at home; that she was choked, that she has since been unable to swallow or eat a morsel of bread (the appearance of dream-like phenomena); that with the money great battles have been fought. In answer to question says: "Yes, you are the doctor,

and have also been concerned in the money question." Expression of face still clouded; pulse 120; sticky skin; temperature not elevated; eats better.

November 11.—Becoming apathetic; lies flat on the bed, with eyes half closed; radial pulse 108 and small, with full carotid pulse; hands cool. Says little, and speaks a jumble of correct answers and dreamy nonsense. For instance, she asks for her clothes, says the drops of blood which have rolled away from her ought to be picked up. She suffers pain everywhere, can not stand up straight, is so very ill and can do nothing to help herself. Retention of urine. On introduction of the catheter, the labia and introitus vaginæ are found considerably swollen. On both nates, especially the left, there are, in a circumference of from one to two inches, erythematous spots with the characteristic reddish brown vesicles of acute decubitus; the latter are dressed. Sherry, strong beef tea with egg.

November 12.—The same apathetic state, while the sensorium is much clearer. The patient answers all questions correctly; begs to go home, and when questioned in regard to her bruises, assures us that she was not beaten at home. Still lies flat on the bed and makes but few spontaneous movements; at the most to feel about herself with her right hand, or arrange the bedclothes. *She keeps the left arm flexed;* passive extension is made without great resistance, but the arm immediately returns to the contracted position; when raised from the bedclothes it falls at once by its own weight. The entire left leg is œdematous, its circumference being five cm. greater than on the right side. Temperature the same as elsewhere. On the tibia and dorsum of the foot the superficial veins are prominent; the leg remains motionless, and when raised falls again

as if paralyzed. Deeper palpation of this left foot elicits groaning; in other respects the sensibility of the skin, on pricking, seems to be diminished, since the patient scarcely utters any expression of pain, at all events not for some time (and this is evidently weaker on the right side). Reflex action is defective and tardy; no disturbance of innervation in the face; pupils equal and respond promptly, although perhaps a trifle more tardily than normal; tongue can not be projected beyond the teeth, and is dry; speech correct in every respect; deglutition perfect; retention of urine; abdomen distended with wind; no stool; pulse 112–120. Features set, slight œdema of entire face; towards evening redness, and marked fever; temperature 38.4 C.; carotids pulsate very forcibly, the left more so than the right. With the onset of fever, consciousness becomes more dream-like; the patient mistakes the identity of persons, and forms from former reminiscences short incoherent sentences, but can nevertheless be brought to answer correctly by calling repeatedly and more loudly; articulation faultless. The left arm still more contracted towards evening; the right arm free and occupied in a variety of picking movements; left leg remains motionless.

November 13.—Free from fever this morning, pulse 80, condition same as yesterday; left arm flexed, left leg swollen, with sensibility of skin less than on the right side; pain, on firm grasping, continues; retention of urine; abdomen distended as yesterday; hard stool after enema, without marked decrease of tympanitis; speech somewhat thicker, but otherwise correct as regards articulation. All answers are clear and prompt; patient is fully conscious; complains of being disturbed by noise at night; desires rest and to be sent home; does not speak *suâ sponte.* An interesting feature to-

day is the psycho-motor paralysis of the left arm. When asked to grasp an object presented to her, she allows the left arm to rest, and makes the necessary motion with the right arm only. If the right arm is held, she is unable to grasp properly with the left. She can not reach the tip of her nose with her left hand, in a free arc of a circle; she succeeds, however, by bringing the hand slowly to the chest, then to the neck, and finally up to the face. The perception of motion for free circular movement to the nose must have become lost. She can attain this end only successively, and by guiding, *i. e.*, sliding the hand along the chest. The left arm, when passively raised to the head, falls slowly down; patient says she can't understand the meaning of it; that she can no longer do anything with that arm, that it seems "bewitched;" great listlessness and defective spontaneity contrast with the otherwise unimpaired consciousness; only asks to drink. Towards evening, 5 o'clock, fresh access of fever, which continues till late in the night, temperature rising to 38.6 C.; pulse 120; head much congested and ice-bags necessary; pupils distinctly smaller; heart-beat very strong; systolic murmur lengthened and accompanied by a friction sound. On the right wrist there is an œdematous spot, with slight fluctuation, and the skin over which is not reddened; palpation painful. To-day the right leg is also somewhat œdematous; sensitive when deep pressure is made, yet there is still a difference in circumference, when compared with the left, leg, which is still movable.

November 14.—Restless during the night; rapped on the wall and called names (hallucinations?), when at rest she lies in a state of languor; the upper lids droop, the tongue is dry, speech is slow, but correct as to form and purport; pulse 128, feeble; temperature

38.5 C.; deglutition good; sensorium, as yesterday, clear, but still there is a lack of spontaneity and interest, with the exception of the repeatedly expressed wish to return home; abdomen less tympanitic; left arm still slightly flexed at elbow; upper arm paralyzed, although on urging, the patient is still able to slightly move her fingers; swelling of left leg slightly diminished; paralysis as yesterday; retention of urine continues; patient somewhat more restless towards afternoon; says she hears stone-breakers outside, who cry "Sessel;" once said she saw ghosts; she refuses gruel, saying it distresses her; in course of afternoon there is again fever (temperature 38.6 C.; pulse 128); face becoming much reddened, particularly the conjunctivæ, and slightly œdematous. The left pupil is markedly contracted; a slight paresis of the left facial is also noticeable this afternoon; patient herself complains of great heat in head, says she is afraid, and wishes she could only be at home. She answers all simple questions correctly, articulation is correct, though thicker and slower. Flexion of the left arm no longer noticeable; it can not be spontaneously raised, though when passively lifted, does not fall down entirely relaxed; sensibility as yesterday; friction sound distinctly heard at apex.

November 15.—Is decidedly worse; pulse 120, temperature 38.5; has taken milk; still clamors to go home; says they are only fooling with her here; complained that her whole body was so painful that she was lost; asked after her sister who, she said, was here (hallucinations?); cried during examination; bed-sore has become much larger, notwithstanding dressing and air-cushion; black crusts have appeared on either side; left arm relaxed, and again slightly contracted at elbows; fingers slightly bent; the alæ nasi have fallen in, and cause whistling respiration; cheeks

flushed; eyes closed, although patient opens them when bidden. To-day, swallows with some effort, complains that she is unable to get anything more down; *undulation of the right jugular vein is marked*; the carotids are full. During the night, several attacks of twitching in face were noticed, with foaming at mouth, and afterwards rattling and cyanosis. The last attack consisted in jerking, and marked trembling movements of the left, paralyzed arm. In the course of the afternoon, several convulsive seizures of a polynorphous character supervened. These were, first, tonic convulsions of face, head and the muscles of the eye (distortion), together with movements of extension in the left arm. Foam at mouth. Patient appeared to be unconscious, but was soon herself again, and partook of proffered beverages. Later came jerking movements of the head and trunk, and more especially on the left side, while consciousness was maintained, and the patient, during this convulsive action, answered all questions correctly. These latter seizures lasted about fifteen minutes; the former were of but short duration; patient asserted in evening that she always knew exactly when they were coming on: her head became, she said, extremely hot, and it seemed as if a big man came towards her. Is fearful just before the onset of seizures, because they cause her so much pain. Patient lies continually in a perfectly indifferent condition, as if half asleep; she takes notice, however, of those who enter, and returns their greeting, which latter, must to-day be expressed in a louder tone. Her speech is manifestly more labored and more easily confused. Thus the patient asks to go home in the evening, because she is "afraid of the Pope." Cardiac action increased, pulse 152. The systolic murmur continues; temperature 38.6. Respiration 42, and

presenting, transiently, a reverse type (respiratio cephalica), at other times it is quite silent, and again extremely loud (approximation to Cheyne-Stokes' phenomena). Towards evening, the left arm is quite paralyzed, and the contraction at elbow has disappeared; ice-bag to heart and head.

November 16.—Convulsive seizures in the night at 12, later at 3, and at 6 in the morning. These were of light character, confined to isolated twitchings now of the right, now of the left arm, or to slight shaking of the trunk, patient remaining conscious. Patient felt their approach each time, predicted their onset, and complained, after their termination, of the anguish they caused her. She always thought she was losing her breath. Tells the physician, whom she names correctly, that she has undergone a great deal. Left arm remains paralyzed, fingers flexed; right arm relaxed, but capable of motion. Face red, shiny, slightly œdematous, eyes closed. Temperature 39, pulse 144, respirations 44, and transiently of reverse type. Heart impulse strong, although less murmur. A thorough examination of the lungs is impossible owing to patient's feeble condition. She is always fully conscious, answers all questions correctly, and gives assent to a visit from her mother. She complains of a sense of great dread; can scarcely breathe. Thinks everything is crowding upon her, and feels as if a stone lay in the cavity of her heart. Otherwise no pain. At noon more convulsive seizures. At first jerking movements of the trunk, then of the head, then twitching of the face, then clonic convulsions of the extremities, especially the left arm. In answer to questions, patient said, during the convulsions, that she did not feel well. A little later she said she felt as if a great weight lay on her heart; she often thought she was shut up in beds.

When she breathed she felt all drawn together; often experienced shocks so that she was tossed about. All this she says perfectly. In afternoon temp. sinks to 38.1. Face flushed. Swallows better again. Pupils continue contracted, not markedly uneven, react slowly, eyelids remain drooped, although she is still able to raise them slightly. Patient groans occasionally. Right half of chest rises a little less than left, and in place of vesicular murmur, ill-defined, harsh respiration is heard, and on that side the percussion note is slightly duller. On right middle finger a subepidermal pus-vesicle. At 4 and 6 o'clock further convulsive seizures, but these are now general, and, for the first time, of a severe epileptiform character. The patient is unconscious during their progress and they leave behind a profound stupor. The order in which the tonic and clonic convulsions occur, is: left arm, left half of face; right arm, right side of face and the trunk. They lasted from one to two minutes; temperature 39.4; pulse 144; deglutition much more difficult afterwards.

November 17.—Passed a quiet night, with the exception of occasional incoherent talking. Towards morning, at six o'clock, short convulsive seizure. In morning patient lies in a somnolent condition; eyes are almost completely closed, face flushed and perspiring; temperature 40.3; pulse 160; respirations 66; breathes laboredly; still gives appropriate answers to single questions; says herself, if only the fits didn't come any more; complains of cramps in her feet; both arms are relaxed, she picks the bedclothes with her right arm; urine passed involuntarily; deglutition more difficult; infusion of digitalis; ice-bag as yesterday.

November 18.—Patient breathed more freely in the first half of the night. At 1.30 an attack of severe oppression; at 5.30 in the morning a convulsion, with

twitchings of face and arms, and very labored respiration. The patient predicts the attack; she feels it coming on, and requests the attendant to give her a drink before, and "afterwards again." Complains of lying wet in the morning; tells physician, on being asked, that she did not have a good night, and that he should be thankful that he was not in her place. Eyes remain closed continually. To-day the difference in innervation of the two sides of the face (in favor of right side) is more strongly expressed than in the last few days; face much flushed, pulse 142 and small; respiration harsh on both sides, 60; abdomen less bloated; urine again passed involuntarily. On inquiry, patient says that she has pain in the abdomen; other questions remain unanswered; digitalis discontinued. At 11.30 in the morning, another attack of clonic twitching, which continued till 1.30, and ended in marked gaping. At 2 o'clock, several short seizures, with interrupted, jerking respiration; the latter now becomes more rapid, and is attended with forced coöperation of the muscles of the nose, mouth and neck. Patient occasionally groans, coma increases; she can not be made to answer questions. Towards evening, commencing tracheal rattling; at 10, still another attack of convulsions; at 11, dead.

AUTOPSY, ELEVEN HOURS AFTER DEATH.

Body of average size, well nourished; on the thigh and leg, more especially of the left side, there are still a few bluish yellow suggilations of the skin. On the right buttock there is a portion of the corium, of the size of two thalers, denuded of epidermis, with a small gangrenous crust in the center. At the corresponding situation on the left side there is a black crust, about

two inches in size, involving the entire thickness of the skin (decubitus acutus). The left lower extremity is larger than the right and œdematous; the superficial veins on the dorsum of the foot are very prominent, and the right leg is slightly larger than normal, but much smaller than the left.

Skull presents nothing special; roomy and symmetrical. Sutures only preserved in parts, diplöe pretty vascular. Calvaria separated from dura mater without difficulty.

The exposed dura mater is much congested, and firm blood clots (swollen veins) and spots of extravasation may be seen through it, *in situ*, near the longitudinal sinus. On incision but few drops of bloody serum escape. The inner surface of the dura mater shows, on the right side, light yellow, fibrinous deposits, and, on the left, a few small blood coagula—both of apparently recent date as they can be easily scraped off.

The arachnoid and pia mater are, on both sides and near the sinus, injected with blood, this being more marked on the right than on the left side. The veins, so far as they correspond to the middle lobe, central convolutions and posterior frontal lobe, are swollen to hard, knotty cords, seeming from their hardness to indicate thrombosis. The inner membranes are much congested, œdematous, and over the frontal lobes here and there slightly thickened, and in circumscribed spots present a whitish or white-yellowish turbidity. They are everywhere easily separable from the cortex without loss of substance. *On cutting open the superior longitudinal sinus, it is found to be completely filled by a thrombus.* This thrombus, to the extent of one inch, and corresponding to the upper end of the central convolutions, is transformed into a yellowish hard, fibrinous plug, which adheres firmly to the wall'

although unattached and separable by means of the scalpel. In front and behind they continue into red consistent coagula, which fill the entire lumen of the vessel, and extend downwards into the torcular. These are only loosely attached to the vein-walls, the latter being intact throughout. The veins which run in from the posterior frontal region and the post-central fissure are, on the right side, completely filled, up to their finest ramifications, with hard, blackish, fibrinous plugs. The same is found on the left side, though the plugs are softer. The torcular contains a loose coagulum, likewise the horizontal sinuses. On the other hand, the sinuses at the base of the brain are everywhere free. After removal of the lower membranes on both sides, several of the convolutions are seen to be of larger volume, softer, much congested, and sprinkled with a great number of fine red punctations (capillary apoplexies). On the left side this is only marked in the cortex of the upper edge near the longitudinal sinus, further down are found scattered, a few small, isolated spots of red softening. On the other side, however, larger circumscribed areas have undergone this change. These are, beginning from behind:

1. The upper end of the posterior central convolution and the beginning of the upper parietal convolution. This focus measures in the sagittal diameter one inch seven lines; in the transverse diameter, one inch. Adjoining this is:

2. A softened, narrow zone at the borders of both these convolutions, extending as far as the interparietal fissure. It follows the sulcus postcentralis, or more precisely, the course of the veins at this situation, which are in a condition of marked thrombosis.

3. A very narrow strip of isolated, red spots extends forwards over the front central convolution, one inch

laterally from the margin of the hemisphere to the beginning of the first frontal convolution, which is also dotted in its posterior origin, with a large number of red isolated foci. In front of, and immediately contiguous to this, is:

4. A second, confluent, red focus of softening, resembling the first focus, and of about the same size (1 inch transversely and 1½ inches vertically). This completely embraces the lateral limits of the first frontal convolutions. Compared with the posterior large focus, the tissue of this anterior one has remained somewhat more consistent, and appears of more recent date.

Successive transverse sections of both these confluent foci show the entire thickness of the cortex much congested and of loose texture.

There is no longer any recognizable design. The tissue has entirely disappeared in the posterior focus. In both parts the softening is continued downwards to the bordering corona radiata, but in so doing assumes more and more the form of scattered islands of softening. The marginal zone surrounding it is of a dull yellow. This appearance is retained in the case of the anterior focus for a depth of about half an inch, but in the latter the last traces may be followed to the roof of the ventricle.

In the left hemisphere, corresponding to the very much slighter affection of the cortex, is a much less injury of the corona radiata, and it is limited only to isolated and very small foci of softening.

In the remaining portions of the brain, beyond general succulence, richness in blood, and here and there œdema, there is nothing remarkable. The ventricles are very narrow, and contain scarcely a trace of serum. No granulation of the ependyma. Vessels of the base free .The arteries are more especially intact, the vein of the right Sylvian fissure contains a loose coagulum.

Cerebellum and medulla free, slightly œdematous.

The spinal cord presents in different parts marked softening of the grey horn so that on section the parenchyma collapses. Otherwise nothing special.

Heart of average size, but covered with a great deal of fat. Heart muscle soft and friable, in a state of decided degeneration; a loose clot partly decolorized is found in the right auricle. Mitral valves shriveled from old thickening; aorta free, without atheroma. Lungs on both sides, anteriorly, at the apices, emphysematous; in the posterior and lower parts, hypostatic; with infiltrations of lobular pneumonia (probably embolic).

Liver moderately enlarged and showing marked fatty degeneration. Gall-bladder distended; blood supply below normal.

Spleen small and friable.

Kidneys pretty much congested, friable. Pelvis of kidney mottled with blood.

Virgin uterus with glairy mucus, and a small polypus in the cervix.

In both crural veins, beginning from Poupart's ligament, are occluding plugs, which gradually become looser as they extend to the ham. The plug in the right crural is firmer, partly colorless, and adheres to the wall of the vein (intact) more closely than on the left side. The latter is older than the former, but both are evidently more recent than the thrombus in the vessels of the brain.

Microscopic examination of the cortex shows that we have not to deal with an acute encephalitis, but a softening with suffusion, and commencing necro-biosis. The characteristic structure of the tissue is maintained at the red injected points, and only partly broken down (by œdema) in the thoroughly softened parts. The

ganglia, on the other hand, are in a state of degeneration, partly glassy involution, and partly from desquamative metamorphosis. Lymphatic coagula with imbedded granular cells are found in single portions of the parenchyma, especially surrounding the vessels. A large number of these latter, even the smaller, are thrombosed and filled with fibrin cylinders. The adventitious sheath is surcharged with red and white blood corpuscles. The capillaries are, for the most part, empty. The yellow, zonular layer in the corona radiata shows an infiltration with pus corpuscles, but without softening of the medullary layer. According to this, the thrombosis is essentially primary, and, judging from the configuration of the blood, that of the sinus the oldest in point of time. There is nothing abnormal in the grey substance of the cord.

REMARKS.

The clinical picture of the foregoing case differs in no essential particular from those which have been hitherto described. Noteworthy is the clearness of the symptom complexus, together with the clear survey of the progress of the disease. A woman in perfect health till the end of October, has, as the result of a profound emotion, an attack of active melancholia, accompanied with sleeplessness. The kernel of the melancholic affection centers in the cause of this emotion (removal of her husband).

The unrest increases, the depression causes increased motor phenomena, with an increased, painful concentration of thought, bordering on mania (melancholia agitans). In rapid succession flights of thought are lost in delirium. The constantly increasing motor phenomena become more and more deprived of their psychical character (tossing about on the floor, convul-

sive biting and striking). Consciousness remains dream-like in the quiet period. The whole picture throws off the character of a functional, cortical disturbance, and assumes the clinical features of an organic, palpable, cerebral irritation. In this condition the patient comes to the asylum. For the first few days the delirium continues with planless, impulsive motor disturbance. Then follows outward rest with increasing clearness of consciousness, during the access, however, of motor focus-symptoms in the extremities (contraction of the arm with paralysis of the leg of the same side) and serious trophic disturbances (decubitus acutus). At the same time symptoms of venous thrombosis appear in the paralyzed leg. The contracted arm presents alternating phases of diminished and recurring spasmodic flexure, and ends in its course through a stage of psycho-motor paralysis in permanent motor paralysis. The paralysis of the leg remains unchanged. Then come symptoms of thrombosis in the other leg. On the left side—that originally affected—there is paralysis, although very slight, of the facial nerve.

Notwithstanding this relative clearness, the processes of consciousness lacked spontaneity: with the exception of a few simple questions and the intimation of immediate wants (drink, bedding), the patient remained quite listless. Death occurred gradually through the lungs. As anatomico-pathological basis of the above described symptoms, there was found post mortem an idiopathic thrombosis of the longitudinal sinus and of the anterior and middle veins of the pia mater, with consecutive red softening of the adjacent cortex. The softening represented a pure, acute necro-biosis. In the lower and gradually less affected portions of the corona radiata, it had reached the first stages of a reactive in-

flammation. The destroyed pneumonic foci in the lungs, as well as the thrombi of the crural veins, were undoubtedly due to a dislodged clot. The anatomical situation of the principal focus of softening, as regards its relation to the motor disturbances, deserves special attention; since it may be positively inferred from the continuance of the paralysis that this was not only of general cerebral, but of a decided cortical nature—this paralysis manifesting, in the left arm, so pronounced a psycho-motor phase before permanent paralysis set in. Did this transition stage correspond to a lesser degree of softening in the cortical field, before this latter became entirely destroyed? Does it thus represent the physiological transition to the marked motor functional paralysis after complete destruction? This unilateral paralysis of the extremities points distinctly, as regards the question of cortical localization, to the two larger foci found in the convolutions. This topographical situation corresponds, with remarkable precision, with the results of Ferrier. The focus in the upper gyrus postcentralis, with partial continuation in the cortex of the first parietal gyrus, corresponds so exactly with Ferrier's center for simple movements of the arm and foot of the opposite side that a causal relation can not well be questioned. In like manner the anterior larger focus in the first convolution corresponds pretty exactly with Ferrier's motor center for complex movements of the arm, only the pathological condition observed by us extends a little further forwards than the area of the experimental physiologist. The gyrus paracentralis (Charcot) is affected to a much less extent (only by capillary apoplexies here and there). The gyrus præcentralis is quite free, and here Hitzig places special motor areas. Moreover the slight, narrow softening at the uppermost

surface of the left hemisphere had run its course without any perceptible effect on the motility. This case corresponds essentially with Neelsen's recent case. (*Archiv. f. klin. Med., B. XXIV.*)

The persistence of consciousness to the last hours of the patient's life, nothwithstanding the extensive destruction of the cortex and corona radiata, may have depended upon the limitation of the cerebral affection to the immediate neighborhood of the veins which were principally involved, whereby the frontal lobes—with the exception of the one larger focus at the posterior origin of the left frontal convolution, remained intact. In the beginning, before the consequences of the venous obstruction were confined to these circumscribed areas, the circulatory disturbance must, in view of the facilities of communication in the pia mater, doubtless have been more general and diffuse, and it is certain that the initial state of depression is referable to this stage of diffuse and extensive disturbance of the vessels (venous hyperæmia).

But whence this extreme circulatory disturbance in the brain at the outset? This question is of interest as regards the etiology of the case as above described. It can only be referred to one undoubted origin, viz., a violent, emotional shock in a person with marked hereditary predisposition, and in the climacteric. As the result, mental disturbance at once declares itself, and retains, throughout the entire delirium and period of anxiety, only the one character—that of the injuring affection, till increasing cerebral pressure removes the irritation, and with it the mental and motor unrest, and again brings into play the function of consciousness, notwithstanding this latter had been materially impaired.

May we not ascribe the condition, in this case, to the vasoparetic effect of such a profound mental shock, which produced the first cerebral blood stasis, and thus formed the starting-point of a local thrombosis in an already invalided brain?

ABSTRACTS FROM HOME AND FOREIGN JOURNALS.

THE SIGNIFICANCE OF FACIAL HAIRY GROWTHS AMONG INSANE WOMEN.—Dr. Allan McLane Hamilton read an interesting paper on this subject at the last meeting of the New York State Medical Society. He cited a number of illustrative cases, a consideration of which, he thinks, will show that:

First. Abnormal growth of hair, especially upon the face, is frequently closely connected with disturbed function of the pelvic organs of women.

Second. That in the insanity of women, especially when it lapses into dementia, and cutaneous nutritive changes exist, such growths of hair are by no means of uncommon appearance.

Third. That their unilateral character, so far as preponderance in growth is concerned, and their association with unilateral cutaneous lesions, such as bronzing and nail-changes, indicate their nervous origin.

Fourth. Their appearance chiefly upon the face in insane patients, and relation to trophic disorders incident to facial neuralgia, points to the fifth nerve as that concerned in the pathological process.

Fifth. The development of hair, with the deposit and pigment of skin lesions, and occasional goitrous swellings, suggests the inference that the neuro-pathological process which leads to the growth of hair in the chronic insane, is akin to that which gives rise to Addison's disease.

He regards any considerable growth of hair upon the face of female lunatics as indicating an unfavorable form of insanity, and especially in the case of women who have not reached middle life.—*The Medical Record*, March 12, 1881.

Insanity and Uterine Disease.—In a recent letter to the *Medical Record*, Dr. Leonard F. Fitkin, of New York, endeavored to show that diseases of the womb constitute one of the principal causes of insanity in females. He says: "The almost invariable presence of some one or more of the various uterine diseases, either functional or organic, in those cases of insanity occurring among females, and the facts brought forth by a thorough and searching inquiry into the history of a large number of cases, have convinced me of the important and serious effect often produced by a diseased condition of the uterus upon the nervous system. * * * * Among nearly one hundred and fifty cases of insanity which I examined during my service in the asylum, in nearly every case I found some uterine disorder, which almost invariably, inquiry would reveal, had existed prior to the advent of mental trouble, in many cases for several years."

Dr. L. Putzel expresses his surprise, in a letter to the same journal, at the wide prevalence of such views among the profession. "In my capacity as pathologist to the insane asylum at which Dr. Pitkin was assistant physician, I have had the opportunity of making nearly one hundred post mortems upon insane females. Although I have no statistics to offer upon the subject, I am nevertheless convinced, from a comparison of the results of the autopsies above mentioned with those derived from considerable experience in autopsies upon sane females, that there is, perhaps, less uterine disease present in the insane than in the sane, and in relatively few cases among the former have any lesions of the genital organs been found worthy of note. Comparatively few women with unbalanced minds will refuse the physician a history of uterine disease if closely questioned concerning the genitalia, and long-continued investigation with regard to the influence of sexual derangements upon the production of nervous diseases in general, have convinced me that in very many cases the mere coexistence of uterine and nervous disease is regarded as sufficient proof of their interdependence. It is unnecessary to dilate upon the fact that the maintenance of such an erroneous view with regard to etiology may be associated with pernicious results with reference to treatment."—*Ibid.*, March 26 and April 9, 1881.

Dr. Clouston on Puberty and Adolescence, Medico-Psychologically Considered.—"I would say a word about prophylaxis in children with a strong neurotic inheritance. My

experience is, that such children who have the most neurotic temperaments and diatheses, and who show the greatest tendencies to instability of brain, are, as a rule, flesh-eaters, having a craving for animal food too often and in too great quantities. I have found, also, a large portion of the adolescent insane had been flesh-eaters, consuming and having a craving for much animal food. My experience, too, is that it is in such boys that the habit of masturbation is most apt to be acquired, and, when acquired, seems to produce such a fascination and a craving that it ruins the bodily and mental powers. I have seen a change of diet to milk, fish and farinaceous food produce a marked improvement in regard to the nervous irritability of such children. And in such children, I must thoroughly agree with Dr. Keith, who, in Edinburgh, for many years has preached an anti-flesh crusade in the bringing of all children up to eight or ten years of age. I believe that by a proper diet and regimen, more than in any other way, we can fight against and counteract inherited neurotic tendencies in children, and tide them safely over the periods of puberty and adolescence. * * * * *

It always seemed to me that there were two things that constantly worked the other way, and that I had to contend against in their treatment. These were the general brain excitability and the morbid strength, and often perversion, of the generative *nisus*. The one tended to mania, sleeplessness, purposeless motor action, thinness and exhaustion; the other to erotic trains of thought, sexual excitement and masturbation. I found that inaction, reading, indoor life and amusements increased the one, while novel-reading, solitariness, and long hours in bed aggravated the other; and animal food and alcoholic stimulants gave increased strength to both morbid tendencies. I therefore, encourage active muscular exercise in every way. But I place my chief reliance on diet, * * * in reality, milk is the sheet-anchor of treatment. I never give such cases alcoholic stimulants. I give to all such patients who can take and assimilate it easily, an emulsion of cod-liver-oil, hypophosphite of lime and pepsine, made and flavoured in such a way that it resembles cream. I find very few, indeed, who can't take this. Beyond this, an occasional bitter tonic is about all the medicine I give."—*Edinburgh Medical Journal*, and *Practitioner*, January, 1881.

Ovarian Compression in Hystero-Epilepsy.—"In many of Charcot's cases of grave hysteria, ovarian pain and tenderness

have been marked features; and the Professor lays great stress upon the occurrence of such symptoms, and upon the fact that firm ovarian pressure will, in hystero-epilepsy, arrest the paroxysms. Our experience does not coincide with this. In the case of hystero-epilepsy spoken of above, ovarian pressure did not arrest the fits; and this is our common experience. In American women, the ovaries do not seem to be often involved in hysteria, nor are we able to feel them or impress them by the method described by Charcot. Often, too, I have seen very marked ovralgia and ovarian tenderness, without hysterical symptoms."—Prof. H. C. Wood, in *Philadelphia Medical Times*, February 26, 1881.

A Long-Lived Lunatic.— A remarkable instance of longevity is related by "*Galignani.*" There died at Bicêtre, in January, a patient 103 years of age, who had been an inmate of the asylum since 1797. When eighteen years of age, he received an injury to his head, by the falling of a piece of glass, after which he became insane. He had the delusion that he was made of glass, and under the influence of this belief, he is said to have scarcely moved during the eighty-three years he passed in the asylum, and to have opened his lips intelligently but once during that period, to ask for tobacco.—*Medical Times and Gazette*, February 19, 1881.

Prevention of Bromic Acne.—Dr. Fairbairn, of Brooklyn, speaks highly of the use of cod-liver-oil, in conjunction with potassium bromide, to counteract the bad effects of the latter drug. He thus sums up the advantage of the oil: "1st, absence of the digestive disorders; 2d, absence of the acne eruption; 3d, that the anæmia usually found in persons taking this medicine continually, is far from being marked; 4th, the body is better nourished, and appetite unimpaired. I have made trial of this treatment in other cases, with similar good results."—*The Medical Record*, December 18, 1880.

Action of the Bromides in Epilepsy.—Dr. A. Hughes Bennett, Physician to the Hospital for Epilepsy and Paralysis, London, has recently published a statistical inquiry into the action of the bromides in epilepsy, by which he endeavors to show that this disease is far from being the alleged *opprobrium medicorum.*

His statistical tables are very elaborate and replete with interesting data. He concludes that there are few, if any drugs at our disposal, which can be demonstrated to have a more beneficial action in the treatment of disease than the bromides in epilepsy, and declines to admit its incurability. Reported cases of complete recovery, he thinks, are rare, chiefly because a long period of treatment is necessary for success. His favorite prescription is: Pot. Brom., Ammon. Brom. aa. grs. xv., Sp. Ammon. Ar. f℥ ss., Inf. Quassiæ q. s ad f℥ i. Thrice daily.

He sums up the inquiry with the following general conclusions:

1. In 12.1 per cent of epileptics the attacks were completely arrested during the whole period of treatment by the bromides.

2. In 83.3 per cent the attacks were greatly diminished both in number and severity.

3. In 2.3 per cent the treatment had no apparent effect.

4. In 2.3 per cent the number of attacks was augmented during the period of treatment.

5. The form of the disease, whether it was inherited or not, whether complicated or not, recent or chronic, in the young or in the old, in healthy or diseased persons, appeared in no way to influence treatment, the success being nearly in the same ratio in all these conditions.

6. In 66.6 per cent there was no trace of bromide poisoning. In the remaining 33.4 per cent this was observed in varying kinds and degrees, but in no case to any serious extent, namely, physical weakness in 28.5 per cent, mental weakness in 18.8 per cent, and the so-called bromide eruption in 16.6 per cent.—*Edinburgh Med. Journal*, February and March, 1881.

Treatment of Epilepsy.—Professor Ball, of Paris, speaks highly of the combination, in equal parts, of the bromides of ammonium and sodium as an anti-epileptic. He gives about a drachm of the "double salt" as he calls it, daily. At the same time he prescribes a pill containing equal parts of extract of belladonna and oxide of zinc. His formula is:

℞ Ext. Bellad.
Zinci Oxid. aa. 1 gramme.
Fiant pil. no. XL. Sg. One night and morning.

In obstinate cases four pills may be given. In congested subjects he has recourse to drastic purgatives, bleeding, or the application of leeches to the temples and behind the ear. His formula is:

℞ Aloës Succotor. 1 gramme.
Resinæ Scamm. } aa. 0. 50 centigrammes.
Resinæ Jalap. }
Calomel. }
Sapon. Amygd. q s.

Ft. pil. No. XXIV. Sg. Six every week, three in the morning on rising and three towards noon.

The superior merit ascribed to this treatment is its almost immediate and continuous action, often beginning from the second day. Treatment must not be suddenly discontinued, but the dose gradually reduced, nor must it be continued for too long a period. The "double salt" does not produce cephalalgia, somnolence and depression, like bromide of potassium. Indeed, it would appear to rouse patients from their torpor and increase their mental activity. Bromide of potassium has no effect in some cases of epilepsy, but Prof. Ball's treatment is said to be invariably beneficial. Lastly, it very rarely causes bromic acne.—*L'Encéphale*, March 1881.

Professor Tamburini on Hallucinations.—Prof. Tamburini recalls the different theories which have been advanced on the subject. Some attribute their origin to the peripheral sensory apparatus; others regard them as purely intellectual phenomena, whilst a third doctrine—the psycho-sensorial—ascribes them to a combination of the two former. A fourth theory, according to which hallucinations emanate from the sensory centers, is that to which Dr. Tamburini adheres, but in completing it with still more precise localizations. According to Dr. Luys, hallucinations have their seat in the optic thalamus, being due to a pathological irritation of this region. Dr. Tamburini considers the optic thalamus nothing more than a route by which the conductor fibres pass. According to him, the termination of the fibres of special sensibility occurs higher up than the optic thalamus, in the cortical centers. In support of his theory, the author cites physiological experiments and clinical facts, which confirm the relationship existing between lesions of the parieto-occipital and temporal regions of the cortex, and disturbances of vision and hearing. He also appeals to anatomy and histology. The latter shows the structural analogy of the posterior regions of the cortex with the posterior horns, of the spinal cord, destined to sensibility, whilst the former following the termination of the optic fibres, reaches as far as the occipital lobe.

These are so many proofs which attest the existence of sensory centers in the cerebral cortex. Just as change in a motor center produces epileptiform movements, so does irritation of a sensory center give rise to pathological sensations. These sensations are mnemonic images of impressions received, which are deposited in the sensory centers, whence they emanate in response to stimulation. The hallucination is simple, unilateral, multiple or complex, according as the irritative process is of slight extent or embraces several groups of cells. Dr. Tamburini concludes his article by recognizing as the fundamental cause of hallucinations, a state of excitation of the cortical sensory centers.—*L'Encéphale*, March, 1881.

Dr. Regis on Forced Alimentation.—In a paper read before the Medico-Psychological Society of Paris, last December, Dr. Régis, of the Sainte-Anne Asylum, discussed the subject of artificial feeding. He alluded to the fact that works on the subject had treated too much of the mere operative procedure to the exclusion of other important aspects of the question. Thus it happens that, as regards practical consequences, little difference is made between transient, and persistent sitophobia, between the patient who refuses food because he is interdicted by celestial voices, or under the belief that it is poisoned, and him whose refusal depends directly upon an organic cause. Where abstinence is dependent, directly or indirectly, upon functional disturbances of an organic nature, he washes out the stomach by means of Colin's pump, with alkaline solutions (bicarbonate of soda or Vichy water), having previously aspirated its liquid (most frequently acid) contents. Not only does this daily practice have a detergent effect on the gastric mucous membrane, but it promotes digestion and corrects the constipation which supervenes in most cases of artificial feeding. He speaks highly of the use of peptones in cases of insufficient and laborious assimilation. These represent, in a small volume, a relatively large quantity of nitrogenous elements, in the form of albuminoids already modified and elaborated by a sort of artificial digestion. Dr. Régis has devised a means of positively determining whether or not the tube has entered the trachea, in any doubtful case. He refers particularly to cases of profound melancholia accompanied by debility and anæsthesia, where the introduction of the tube into the air passages is followed by no appreciable reaction. His invention consists of a tube of small calibre, armed at its extremity with an inflatable piece of caout-

choue, and which, in a state of vacuity, may be easily introduced into the stomach within an ordinary tube. The tube inserted, he forcibly injects air by means of a ball, and thus causes the india rubber to dilate, when, if the trachea has been entered, symptoms of asphyxia at once supervene, while nothing unusual occurs if the instrument is in the œsophagus. In the former case, the air is allowed to escape and the tube instantly withdrawn and reintroduced.—*Annales Médico-Psychologiques*, January, 1881.

General Paralysis in an Imbecile.—M. Christian relates a case of general paralysis in a man who, born in 1824, was under treatment by Calmeil, at Charenton, from 1855 to 1860, as an imbecile. His friends assumed the care of him till 1878, when he again became disturbed, having delusions of persecution, and manifesting marked mental enfeeblement. Cerebral congestions became frequent, and a general paralysis was observed to appear and follow a usual course. M. Christian thinks that the coincidence of the two conditions has not yet been described, although M. Foville has observed a similar case. He sees no reason why a meningo-encephalic inflammation, which produces general paresis, should not occur in a feeble-minded person as well as in one in the enjoyment of all his faculties. Were the cerebral congestions the cause of the meningo-encephalitis, or are they to be regarded as symptoms of the affection? The answer will necessarily vary according to our theory of the mode of development of general paralysis.—*Ibid.*

Dr. C. Reinhard on Hyoscyamia.—Dr. Reinhard, of the Dalldorf Asylum, Germany, sums up his views on the use and effect of hyoscyamia, as follows:

First. Hyoscyamia has a calmative effect in many cases of mania, and shortens their duration. It seems to act most favorably in states of excitement which occur synchronously with the catamenia.

Second. It sometimes acts favorably in epilepsy, in so far as it diminishes the number and intensity of the seizures.

Third. The state of the pulse seems to be one of the conditions of favorable operation; it must be contracted and tense.

Fourth. Contra-indications are diseases of the arteries, heart and lungs. On account of its effect on the heart and nutrition, it

ought never to be used for a long period of time consecutively. The main danger lies in paralysis of the heart.

Fifth. On the whole, to hyoscyamia as a therapeutic agent, only moderate value can be ascribed.—*Archiv. f. Psych. u. Nervenkr.*, XI Bd., 2 Heft.

Women *versus* Special Brain-Work.—The London *Lancet* for March 5th contains a leading article on the "Influence on Women of Special Brain-Work," in which the ground is taken that the higher education of women is radically an economic mistake. While it admits that the physical basis of mind may be improved by the force of culture through successive generations, the attempt is made to show that, when carried beyond certain limits, this very process of development involves destruction and exhaustion of intellectuality. The not unfrequent mental instability of children of highly cultivated parents and forefathers, with its liability to degenerate into a neurosis, is thus accounted for; and this is said to be especially true of males in a family remarkable for the culture of its female members. "In the ordinance of nature the female is endowed with a force tending to the reproduction from her arrested or suppressed organism of the perfect organism of the male. It is essential to the accomplishment of this physiological task that the female should be trained for the development of *capacity*—that is receptivity—as a cerebral property, rather than impressed with the particular bias of education in a special class of subjects, or on formulated lines." This distinction is claimed to be borne out by the experience that the male children of mothers, who have been distinguished for *special* mental attainments, are not, as a rule, noted either for intellectual power or achievements; whereas the male offspring of women of *general* intelligence, without special talents, do, as a matter of fact, commonly exhibit these latter characteristics. "Experience seems to show that special brain-*work*, on the part of the mother, exhausts the energy of brain-development—or reproduction—which, if conserved, would express itself in the mental perfection of her male offspring. The operation of the law of 'development by work'—universal in its application under normal conditions—seems to be suspended when the work done is the result of a concentration of energy, by which force is drawn off from centers other than those thrown into special activity." The article does not question the educability of women to the level of men in any

particular direction, the greater pliability of the female mind seeming to render it, indeed, all the more susceptible of special achievements. It insists, however, that "the possible is not always the prudent," and, in conclusion, raises a warning voice against jeopardizing the feminine stock and the entire race by encouraging women to stray beyond their appointed sphere, for the sake of mere ephemeral distinction—a mischief which can not but eventuate in increase of mental enfeeblement and insanity.

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BOOK NOTICES.

A Treatise on Common Forms of Functional Disease. By L. PUTZEL, M. D., Physician to the Clinic for Nervous Diseases, Bellevue Hospital, etc., etc. New York: Wm. Wood & Co., (Wood's Standard Medical Library), 1880.

Dr. Putzel, while declaring that he is not one of those who "sneer at the term 'functional' disease and deny its very existence," is "fully convinced, in view of the fruitless search of pathological anatomists," that the diseases considered in this work "present no primary anatomical changes which are visible to the naked eye or to the microscope—in other words, that the changes in structure are of a molecular nature." He expresses the opinion that perhaps the solution of their pathology lies in the way of physiological chemistry.

The diseases treated of in this work are chorea, epilepsy, neuralgia and peripheral paralysis.

The first disease treated of is chorea, and the chapters devoted to its consideration are among the best in the book. The section upon pathology reviews the various opinions which are held, but does not add anything definite to the subject. Nothing new is suggested in the line of treatment.

Following that upon chorea, comes the section on epilepsy, which is, for the brief space it necessarily occupies, an excellent consideration of the subject. The matter is illustrated by the recital of interesting clinical cases. Regarding the pathological explanation of the phenomena observed in epilepsy, the author, while refraining from committing himself to any theory, evidently leans to that of Hughlings-Jackson.

The remaining portions of the work are fairly up with the times, and the book, as a whole, makes a convenient collection of well-digested facts upon four subjects of importance and interest to the general practitioner as well as the specialist, while it is for the former that this work is more especially intended.

Diagnosis and Treatment of Ear Diseases. By ALBERT H. BUCK, M. D., etc. New York: Wm. Wood & Co., (Wood's Standard Medical Library), 1880.

This work is mainly the result of the personal experience of the author, it having been his aim "to present in text-book form, a picture of diseases of the ear, as they have appeared to me in private and hospital practice," and to describe "those methods of treatment * * * found both safe and efficient."

Opening with a somewhat cursory sketch of the physiology of the ear, involving also an outline of its anatomy, Dr. Buck passes on to a description of the methods of making examinations of the ear, and the instruments to be employed. Diseases of the auricle come next upon the list involving a discussion of eczema, inflammation, hæmatoma or perichondritis, new growths—tumors, etc.—and miscellaneous diseases involving congenital malformations. In treating of hæmatoma auris, the author refers, among other papers, to the article by the late Dr. Hun, published in this JOUR-

NAL, July, 1870. After discussing the various theories that have been suggested to account for this disease, Dr. Buck says that the facts "justify the belief that insane persons are more liable to the disease under consideration, simply because mal-nutrition reaches a higher grade among them (taken as a class) than among the mentally sound." While this may account, in some measure, for the condition, we are inclined to the belief that grave disease of the nervous centers to be anticipated in this class, more fully accounts for the greater frequency of the disease among the insane.

We are not so sanguine as is Dr. Buck, that a cure can be brought about in many of these cases without deformity.

The description of the various diseases of the auditory canal, middle ear, etc., are excellent, and the treatment advised is judicious and the result of an intelligent application of the fruits of an extended experience. In advising the use of instruments rather than the syringe in removing impacted cerumen, Dr. Buck has stepped over the bounds established by tradition, and will, in consequence, be criticized by some. With the majority of such cases occurring in the insane, we believe the syringe, though less expeditious, to be more safe; but in hands accustomed to delicate manipulative efforts, proper instruments, such as described by Dr. Buck, will be equally safe, more satisfactory and expeditious. We commend the work as among the best practical treatises on ear diseases.

Medical Heresies: Historically Considered. A Series of Critical Essays on the Origin and Evolution of Sectarian Medicine, embracing a Special Sketch of Homœopathy, past and present. By GONZALOO C. SMYTHE, A. M., M. D., etc. Philadelphia: Presley Blakiston, 1880.

This book after a rapid and interesting sketch of the various systems of medicine, which have flourished

from time to time, is mainly devoted to a consideration and calm argumentative refutation of the claims of homœopathy to be considered as a scientific system of medicine. The chapters are interesting, and, if placed in proper hands, would prove of value perhaps; but, on the whole, we doubt the utility of efforts spent in this direction. The majority of adherents to the various "isms" of medicine have generally become so upon grounds which it would seem useless to attempt to refute by reason or example.

How a Person Threatened or Afflicted with Bright's Disease Ought to Live. By JOSEPH F. EDWARDS, M. D. Philadelphia: Presley Blakiston, 1880.

In the hands of a physician well versed in the symptomatology, pathology and treatment of Bright's disease, this little primer might afford a few moments of profitable diversion by calling to mind such simple facts regarding diet, hygiene, etc., as had escaped his memory or notice; but we doubt its value in the hands of lay readers—believing in the old theory that with an ordinarily active imagination, and a popular medical work, most individuals will read themselves into a conviction that they have any or all of the diseases described.

Aphorisms in Fracture. By RICHARD O. COWLING, M. D. Morton's Pocket Series, No. 2. Louisville: 1880.

This little pocket edition of "Aphorisms" is really an excellent memorizer, and more a safe guide in the treatment of most fractures. Written in its author's well known terse style, the directions can not well be misunderstood, and their value is enhanced by the fact that they aim directly at the mark and do not stray into the by-roads of theory or experimentation. As

most of our readers know, the talented author has recently died in the midst of his career from rheumatic endocarditis, and we can not close this notice without placing on record our appreciation of his value as a physician, a man, and best of all as a friend.

REVIEW OF AMERICAN ASYLUM REPORTS, 1879–80.

MAINE:

Report of the Maine Insane Hospital: 1880. Dr. H. M. HARLOW.

There were in the Hospital, at the date of the last report, 419 patients. Admitted since, 188. Total, 607. Discharged recovered, 57. Improved, 33. Unimproved, 43. Died, 38. Total, 171. Remaining under treatment, November 30, 1880, 436.

The Trustees in their report express their conviction concerning the increase of insanity, and cite the experience of the Maine Hospital, in a steadily increased average number under treatment, as supporting this theory. We doubt the accuracy of conclusions drawn from the experience of a single hospital. Moreover, the Trustees seem to wholly overlook the increase of population in their State from 1870, when the average under treatment was 363, to 1880, when it rose to 412.

The Trustees have adopted wire mattresses instead of the straw ticks, which they state in point of comfort, cleanliness and economy, justifies the expenditure. There can be no question that in all hospitals for the insane wire mattresses are not only the most economical, but the true sanitary device. They speak of an effort to utilize the sewage of the institution to enrich the land by carrying it some distance into a vat, where a pump is placed driven by a wind-mill. In this way they propose to flow it over the ground. As the works

were only completed last fall they can not give any results. The Trustees state that the water supply has always been deficient. "The supply for domestic use was not in excess of 7,000 gallons per day when water was most abundant," and "the only fire protection was by means of a hand engine and some small underground sewers, and some six or seven chemical fire extinguishers."

The disastrous fire in the Minnesota Asylum seems to have aroused the Trustees to the importance of securing a larger supply of water. From a well they now receive over 20,000 gallons a day, and they have constructed a storage reservoir to contain 5,000,000 gallons. This they hope to keep full from the surplus of the well and the rainfall. The Trustees say that from motives of economy, and after careful consideration, they have "decided to dispense for the present with the office of assistant physician," by which they claim "we are saving the State an expense of $1,200 to $1,500, annually." This reduces the medical staff of the asylum to the superintendent and one assistant, with a daily average of 412 patients. This is economy in the wrong direction.

VERMONT:

Biennial Report of the Vermont Asylum for the Insane: 1879–80. Dr. JOSEPH DRAPER.

There were in this Asylum, at the date of last report, August 1, 1878, 459 patients. Admitted since, 177. Total, 636. Discharged recovered, 36. Improved, 49. Unimproved, 55. Died, 49. Total, 189. Remaining under treatment, 447.

The Trustees report that extensive alterations and repairs have been made in some of the wards, and that these have somewhat reduced the capacity of the insti-

tution, some of the space devoted to sleeping rooms having been appropriated to other "important uses." The system of steam heating has been completed, and a fan for forced ventilation introduced, "from which all the benefits hoped for have been fully realized."

The Superintendent, after a resumé of the work of the biennial period which the report covers, makes some remarks upon the "Causes and Phases of Insanity." He believes that "constitutional predispositions operate much more potently in the production of insanity than the multiplied, exciting causes which have come to be regarded as factors."

Dr. Draper believes in heredity as actively operative in the production of insanity, and seems to lean to the theory that pauperism and crime are also fostered and increased by this means.

MASSACHUSETTS:

Third Annual Report of the Temporary Asylum for Chronic Insane at Worcester. Dr. HOSEA M. QUINBY.

There were in this Asylum, at the date of last report, September 30, 1879, 371 patients. Admitted since, 42. Total, 413. Discharged, improved, 6. Unimproved, 11. Died, 23. Total, 40. Remaining under treatment, 373.

This Asylum is gradually being remodeled to meet the present "ideas as regards light and ventilation," and, aside from the tables and a few remarks upon the employment of patients, the report consists of a description of the work done in this direction.

Forty-Eighth Annual Report of the State Lunatic Hospital at Worcester: Dr. JOHN G. PARK.

There were in the Hospital, at the date of last report, September 30, 1879, 490 patients. Admitted during

the year, 233. Total, 723. Discharged recovered, 41. Improved, 52. Unimproved, 50. Died, 47. Total, 190. Remaining under treatment, 533.

The Superintendent has prepared a series of tables, which include all the cases admitted to the Hospital since its opening, and give, as far as it was possible to obtain it, the hospital history of each patient, including the number of times admitted to the Hospital, and the number who, upon discharge from the Hospital, were sent to institutions of a similar character. From a study of this table, it is seen that of the 12,401 cases admitted from the opening of the Hospital, in January, 1833, to September 30, 1880, 3,155 were re-admissions, 1,316 had previously been inmates of other hospitals, and 1,195, upon their discharge, were removed from this to other hospitals. The number of first admissions to the Asylum, was 9,246, Of these, 3,371, or 36.46 per cent have been discharged recovered. Of the 3,155 re-admissions, 1,263, or 40.05 per cent have been discharged recovered. These are divided as follows: 1,891 are second admissions, 649 of whom recovered; 588 are third admissions, 257 of whom recovered; 254 are fourth admissions, 115 of whom recovered; 126 are fifth admissions, 65 of whom recovered; 68 were sixth admissions, of whom 46 recovered; 47 are seventh admissions, of whom 28 recovered; 35 are eighth admissions, of whom 20 recovered; 29 were ninth admissions, of whom 18 recovered; 25 were tenth admissions, of whom 15 recovered; 23 were eleventh admissions, of whom 11 recovered; 18 were twelfth admissions, of whom 11 recovered; 15 were thirteenth admissions, of whom 8 recovered; 10 were fourteenth admissions, of whom 8 recovered; 8 were fifteenth admissions, of whom 5 recovered; 4 were sixteenth admissions, of whom 3 recovered; 4 were seventeenth admissions, of whom 3

recovered; 4 were eighteenth admissions, of whom 2 recovered; 2 were nineteenth admisions, of whom 1 recovered There were one each of the twentieth, twenty-first, twenty-second and twenty-third admissions, all of whom recovered.

These statistics are certainly remarkable, and would seem to show that, in that Institution, the re-admissions present the largest percentage of recoveries. The tables distinguish between persons and cases. For instance, the number of cases admitted to the Worcester Hospital, for the fiscal year, covered by this report, is 233, while the number of persons represented, is but 222—"ten cases being re-admissions of persons discharged during the year, and one being simply a transfer from private to State account." The habit of counting cases discharged and returned during the same fiscal year, as "re-admissions," probably accounts, in a large measure, for the fact that the number of persons treated at the Worcester Lunatic Hospital, represents but three-fourths of the number of cases. This discrepancy between "persons" and "cases," is increased, in a small measure also, by the custom of counting a case "re-admitted," whose charge has simply been transferred from private to public account, or *vice versa*. One hundred and fifty-two "re-admissions" have occurred, since the opening of the Hospital, in this manner, without the persons represented leaving the Hospital.

From a study of Dr. Park's tables, it will be seen that 1,264, or about one-tenth of the number of cases treated, have been admitted three or more times. Of these, 614 have been discharged recovered. When such statistics as these are presented for the consideration of thoughtful persons, it is not surprising that statistical statements concerning the curability of in-

sanity, should be called in question. It seems to have fallen to the lot of the Worcester Asylum, to have received and discharged a large number of paroxysmal cases of insanity, cases which ought not to be tabulated among recoveries. These statistics, if they prove nothing else, show plainly that the individual or individuals who have the construction and compiling of statistics like these, must be taken into account, in drawing conclusions from them, and that the personal equation is by no means an unimportant one, in making deductions from asylum statistics.

Twenty-fifth Report of the State Lunatic Hospital, at Northampton. Dr. PLINY EARLE.

There were in this Institution, at the date of last report, September 30, 1879, 442 patients. Number received during the year, 117. Total, 559. Discharged, recovered, 28. Improved and much improved, 34. Unimproved, 19. Died, 29. Total, 113. Remaining under treatment, 446.

As has been the case in previous reports Dr. Earle has considerable to say upon the curability of insanity. Speaking of the recoveries in his hospital for the past year, he says: "Of the 84 patients who left the hospital in the course of the year, there were 28 * * * who, *according to our standard of mental health and our judgment in regard to the extent to which, in individuals, that standard is modified by temperament, idiosyncrasy, education and habits*, were properly recorded as recovered. No person recovered twice within the year, and consequently the number of *persons* and of *patients* who recovered was the same."

Seven of the cases which recovered were re-admissions. Two had been previously admitted once each, four twice each, and one eleven times.

"In three of the persons the mental disorder could properly be called constitutional recurrent mania, and in three others it appeared to be the consequence of the excessive use of stimulants."

Of the seven persons who had been treated previously in the hospital, two men had recovered once each, one of whom had also been discharged improved once; one man had been discharged much improved, one woman had recovered once and improved once, and two women had recovered twice, and one woman recovered eight times and improved three times. The whole number of former recoveries of this group was 15. These same persons have now been discharged recovered a total of 22 times. One of the group, a man, we are told, committed suicide by drowning about ten months after his discharge.

Dr. Earle bases his remarks upon the curability of insanity largely upon the statistics of the Worcester Hospital, some of whose remarkable features we have already touched upon in an analysis of the last report of that institution. If the methods which have been followed in that institution in the preparation of statistics have been common throughout the State of Massachusetts, we are not surprised at the unsatisfactory conclusion to be drawn from Massachusetts' Asylum statistics. In the report of Dr. Earle's institution now under consideration, we are told that the mental disorder in three of his recoveries for the last year "appeared to be a consequence of the excessive use of stimulants," cases which we suspect in many institutions would have been discharged as cases of intemperance, and "not insane." Indeed it appears to have been so rare to discharge patients as "not insane" from Massachusetts asylums that the forms for the preparation of statistical tables, adopted by the Massachusetts

State Board of Health, Lunacy and Charity, contain no provisions for this class of cases, and we find, in corroboration of this, that of the 12,401 cases, representing 9,246 persons admitted to the Worcester Hospital since 1833, but four have been discharged "not insane," a condition of affairs which either reflects credit upon Massachusetts physicians who have examined cases for admission into asylums, and upon courts and juries who have had to deal with criminal cases who have interposed the plea of insanity, or shows that the table of recoveries has been made to include numerous cases of ordinary delirium from fever, meningitis, etc., and cases of hysteria, intemperance, and opium habit which inevitably find their way into asylums.

This is not the occasion to discuss the familiar views of Dr. Earle, or to attempt to controvert any of the seven propositions or conclusions which he has published. We hazard the opinion, however, that the examination and tabulation of a large number of admissions to an asylum, where care has been taken to draw a line between cases of true insanity and those mentioned above, and where paroxysmal and periodical cases have been regarded as such and have not been allowed to appear in the table of recoveries, would fail to reveal a condition of affairs which would confirm Dr. Earle's conclusions, but that on the contrary the generally accepted views regarding the curability of insanity would be found in the main to be correct.

Twenty-Seventh Annual Report of the State Lunatic Hospital at Taunton. Dr. J. P. Brown.

There were in the Asylum, at the date of last report, 559 patients. Admitted during the year, 190. Total, 749. Discharged recovered, 49. Improved and much improved, 64. Unimproved, 34. Died, 46. Total, 193. Remaining, September 30, 1880, 556.

Dr. Brown evidently does not share Dr. Earle's views regarding the curability of insanity. Speaking of the discharges in the institution, he says:

"Some of those discharged recovered will become insane again; and it is possible that some have been discharged recovered who had recurrent mania, the type of the disease not having been fully developed. Others may have fresh attacks of insanity from the same or other exciting causes, but if other attacks do occur it will not necessarily follow that recovery was not made from the first. We do not so reason in regard to other diseases. We do not say that a person with a rheumatic diathesis, who had had repeated attacks of rheumatism, but during the intervals is free from it, has not recovered from each attack. We say he has recovered, but is liable to have it again; so with other diseases which are repeated from constitutional tendencies. It is evident that a person may have several attacks of insanity in which the disease may spring up *de novo* each time."

Referring to the table on causation, the Doctor says:

"Could a complete history of each case of insanity be obtained no doubt the percentage of causation from hereditary influence would be much increased. It may be seen from the same table that intemperance, as in years before, takes a leading place among the causes of insanity of those admitted during the year; but any statistics on the subject must necessarily be very imperfect, and may express a larger or smaller number of persons actually made insane by intemperance than the facts would warrant if accurately obtained. If a person has been drinking to excess before his committal to a hospital, intemperance is often assigned as the cause of his insanity, when in fact it may be only a symptom or result of a diseased brain, as is often the case in general paralysis and other forms of brain disease."

The report closes with a recapitulation of the work done in the institution, and a statement of the repairs which are still necessary.

Third Annual Report of the State Lunatic Hospital at Danvers. Dr. Henry R. Stedman.

There were in the Asylum, at the date of last report, 533 patients. Admitted during the year, 581. Total,

1,114. Discharged, recovered, 165. Improved, 106. Unimproved, 151. Died, 83. Not insane, 2. Total, 507. Remaining under treatment, September 30, 1880, 607.

Dr. Stedman informs us that at the time of making this report there were in the asylum nearly 90 patients upon whom no key is turned, who are at liberty to leave their rooms at any time of day, and who may, without attendance, go wherever they please, provided they promise not to leave the grounds. This freedom, he says, has been found to be of advantage, and declares that the patients have not taken advantage of the liberty thus accorded to elope. As evidence of this fact, he points out that of the 34 elopements during the year, but five were by patients living on the open wards; that of these, three were habitual drunkards.

Accompanying the Superintendent's report is that of the Pathologist, which, however, contains nothing of interest.

This report is made by Dr. Stedman, who has been Acting Superintendent since August 9th, at which time Dr. May resigned the superintendency.

RHODE ISLAND:

Thirty-Seventh Annual Report of the Butler Hospital for the Insane. Dr. JOHN W. SAWYER.

There were in the Hospital, at the commencement of the year, 148 patients. Admitted since, 122. Total, 270. Discharged recovered, 38. Improved, 40. Unimproved, 13. Died, 8. Total, 99. Remaining under treatment, 171.

The Trustees, in referring to the beneficent work of the institution say:

"There has been a continued and regular progression. The patients enjoy a greater variety of better and more carefully prepared food. They have better furniture, greater freedom, more out-of-door exercise, more recreation, and there is better opportunity for the encouragement, whenever possible, of cultivated and refined tastes."

As one instance of the increased facilities for recreation, the Trustees mention the fact that, "ten years ago a single horse and carryall, with the assistant physician at odd times as driver, furnished all the carriage exercise available for the patients. Now eight horses, with comfortable carriages and three drivers, are at their service."

Among the special improvements during the past year has been the construction of a large bay window on one of the female wards, the gift of Dr. Isaac Ray. This institution closes the year with a larger number of patients than at any time since its opening, and the report of the Superintendent and Trustees show that the work under their direction is being carried on with a view to the best interests of the insane for whom they are called upon to care.

CONNECTICUT:

Fifteenth Report of the Connecticut Hospital for the Insane. Dr. A. M. SHEW.

There were in the Asylum, at the date of last report, 510 patients. Admitted during the year, 144. Total, 654. Discharged recovered, 30. Improved, 29. Unimproved, 37. Died, 30. Total, 126. Remaining, 528.

To meet the call for increased accommodations, and at the same time to provide for the accumulation of chronic insane in the State, there is being erected on the grounds of the Hospital "a group of brick buildings, in which provision will be made for 262 of the more quiet chronic patients who require little medical care."

Dr. Shew says that to give accommodations to some of the patients who were waiting, and for whose admission application had been made, "we have recently remodeled and furnished a farm house, situated one-half mile to the rear of the hospital, which affords good accommodations to twenty quiet female patients." This makes the third building of the kind now in use at the Hospital. The doors are unlocked and the windows unguarded. The Superintendent says, "we have for ten years treated insane patients in two 'open' cottages. To reason from this that all patients could be thus cared for would be illogical." If persons can remain half a mile away from the main building and need little or no professional care, and the doors and windows can all be left open and unguarded, the question naturally arises why they should be on hospital grounds at all, and why they should not return to their homes?

Regarding the popular idea that insanity is increasing, Dr. Shew remarks that there are facts to be taken into consideration—first, that the population is increasing and that the present methods of care and treatment of the insane are such that their lives are immeasurably prolonged. He says that it can be shown by actual records that the proportion of new or recent cases occurring in the State of Connecticut during the past year bears about the same relation to the total population as did the number of new cases to the population twenty years ago. He calls attention to the fact that the apparent increase is caused also by treatment in hospitals of cases which a few years ago were kept quietly at home, and consequently away from public notice.

NEW YORK:

Twenty-First Annual Report of the Asylum for Insane Criminals, Auburn. DR. THEODORE DIMON.

There were in the Asylum, at the close of the last fiscal year, 135 patients. Admitted during the year, 45. Total, 180. Discharged recovered, 14. Improved, 2. Unimproved, 3. Not insane, 8. Died, 4. Total, 31. Remaining, September 30, 1880, 149.

Dr. Dimon in his report makes some remarks upon the occurrence of insanity among convicts. Crediting the convict insane sent to the asylum to the prisons to which they were originally sentenced, he finds that there were sent from the Auburn Prison, with a population of 900, seven insane criminals; from the Clinton Prison, with a population of 500, four insane, and from Sing Sing, with a population of 1,500, twelve insane, or a proportion of about eight-tenths of one per cent of the population of each prison were found to be insane during the past year. Extending his inquiries still farther, Dr. Dimon finds that there were in the Asylum, on the 30th of September last, 93 male patients sent from State prisons, with a probable prison population of 2,900, giving the proportion of the insane to the entire prison population of three and one-fifth per cent, or ten times the estimated proportion of male insane to the male population of the State.

Is this legitimate statistical information? The proportion of insane to the general population of the State is based upon a reasonably fixed population ascertained with sufficient accuracy by census enumeration, while the proportion of insane to the prison population is based upon a constantly changing number of individuals. Indeed a considerable portion of the 93 insane convicts entering into this calculation may have been drawn from prisoners whose terms of service hav-

ing expired, have been absorbed into the general population of the State.

As a conclusion to some quite interesting remarks upon the influence of long and short sentences upon the production of insanity in prisons, Dr. Dimon says: "I am satisfied that depression and despair arising from contemplation of long, future deprivation of liberty, and fear of dying before termination of sentence, act directly in developing insanity in the prisons." He further says, after an examination of the subject, and after showing that other diseases than insanity are not prevalent in State prisons, that it is a fair inference that convicts bring into prison an unusual predisposition to insanity, and that long sentences are among the exciting causes in developing it. "Given," he says, "a criminal diathesis add to it alcoholism and syphilis, and you have the history of a large number of chronic insane.

Annual Report of the Willard Asylum for the Insane: 1880. Dr. JOHN B. CHAPIN.

There were in the Asylum, at the close of the last fiscal year, 1,502 patients. Admitted since, 280. Total, 1,782. Discharged recovered, 16. Improved, 39. Unimproved, 9. Died, 89. Not insane, 1. Total, 154. Remaining, 1,628.

The total number received since the opening of the Institution, in 1869, is 2,677. During the same period, there have been admitted to the Utica Asylum, 4,877 cases, or nearly double the number. Sixty-three have been discharged recovered since the opening of the Asylum, 188 improved, 164 unimproved, 632 died and 2 were not insane. It would be interesting to know how many of those discharged not recovered were able to return to their homes, and how many were sent to

County Asylums. As to the duration of insanity before admission, the statistics show that 70 of the cases had been insane over 30 years, 123 over 20 years, 379 from 10 to 20 years, 497 from 5 to 10 years, 984 from 1 to 5 years, while in 65 cases, the insanity was *less* than 1 year in duration. In 559 cases, its duration was unascertained. The average duration of insane life in those who died was about 11 years.

The Trustees state that the Institution has, with the new group of buildings just completed for the women, accommodations for from 1,750 to 1,800 patients.

In his remarks upon labor and employment for patients, Dr. Chapin asserts that there is a very marked difference in the *morale* and personal traits of character, as regards tractability and submission to authority, between the English lower classes and our own. He says "that, while patients in the Asylums of Great Britain are said to preserve the docile and tractable manner which characterize them in their sane state, in this country, the same kind of persons, as well as the natives, assume an independence, and refuse, oftener, to perform the simplest labor, unless paid the usual wages, preferring to be supported in idleness than to do anything to contribute to the general welfare, or to lighten the cost of support."

Dr. Chapin believes that many have been too sanguine in their expectations from labor of the insane, looking even to great diminutions in the cost of maintenance, if not to actual self-support. He says:

"The report of labor and occupation shows that the patients have been occupied a stated number of days. It must not, however, be inferred from all this that the result was profitable, and that it was indispensable to the administration of the Asylum, or that it was equivalent to work for which money would be paid. It is erroneous to suppose, as has been publicly stated, that the quantity and quality of the labor of the insane will equal that of

the same number of the sane. The wages of attendants who supervise it is always a serious offset against the avails. The value of the labor of the insane, considered solely from a pecuniary view, would not be appreciable in comparison with the great plant and machinery necessary to develop it and give it practical direction. Neither should the community be impressed with the idea that a system may be devised under which all the insane may be induced to labor, and that the administration of the Asylum is censurable to the extent that it fails in this respect. In answer to such an assumption, it should be sufficient to state that nearly two-thirds of the earlier admissions here had not the mental capacity to dress themselves or attend to the calls of nature, much less the ability to engage in mechanical trades or in skilled labor. Though the character of the admissions during the last half of the present decade of the Asylum history has changed very much for the better, it must still be borne in mind that the population of the Asylum is made up largely of persons of enfeebled mental power, and of those whose physical condition is so impaired as to unfit them for continuous manual labor. Another class possesses the physical ability to labor, but by reason of dangerous delusions and propensities, are unsafe to be at large, or are harmless, and not having the mental capacity for self-preservation or support, without friends to exercise any custodial care or a place of abode, they drift into an asylum as a final refuge.. Many of this class possess the physical strength and intelligence to labor, but decline to do so on account of strong delusions, or unless paid a compensation beyond the ability and policy of the institution to offer."

Dr. Chapin has unusual facilities for solving this problem, with a farm of 792 acres at his disposal. In regard to the introduction of mechanical trades, he recognizes the risk of thereby increasing the cost of support; an interesting fact and one of important bearing upon the subject is mentioned in this connection. By a comparison of 335 admissions into one of the asylums of England, with 280 admissions into the Willard Asylum, it is shown that in the former 61 different trades or occupations were represented; in the latter but 26. While these statictics probably point to a difference in the social system of the two countries,

as far as the training up of the young to some distinctive trade is concerned, the real value of the comparison is lost by the absence of any information concerning the occupation of the people in the districts from which the admissions to the two Asylums are drawn.

Annual Report of the Bloomingdale Asylum. Dr. CHARLES H. NICHOLS.

There were in the Asylum, on the first of January, 1880, 184 patients. Admitted during the year, 114. Total, 298. Discharged recovered, 24. Improved, 30. Unimproved, 7. Died, 23. Total, 84. Remaining under treatment, 214.

Dr. Nichols takes a pessimistic view of insanity and its treatment when he says:

"It has long been obvious to alienists that throughout the most enlightened countries of the globe insanity is not only increasing in proportion to population, but is becoming less curable. The character, in respect to prospect of recovery of the cases received this year illustrates the second branch of this thesis. Not less than 48 of the admissions were affected with forms or complications of disease that are insusceptible either of complete or permanent amelioration."

"The most important event of the year was the opening of the John C. Green Memorial Building for the reception and treatment of patients." This building is designed for the reception of women patients, and, being situated on the west side of the grounds, its opening necessitated the transposition of the entire number of patients, the women from the east to the west wing, the men taking their places.

Dr. Nichols recapitulates the repairs and additions which have been made during the year, some of which have been quite expensive, including, among other things, an entire change in the method of heating the original buildings.

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Annual Report of the New York City Asylum for the Insane: 1879. Dr. A. E. MACDONALD.

There were in the Asylum, at the date of last report, January 1, 1879, 989 patients. Admitted during the year, 393. Total, 1,382. Discharged recovered, 53. Improved, 60. Unimproved, 23. Not insane, 5. Died, 145. Total, 286. Remaining, 1,096.

Dr. Macdonald remarks that "the entire cost of providing food, clothing, medical stores, fuel, gas and other necessaries, of keeping the buildings in repair and of remunerating officers and employees, has been at the rate of thirty cents a day for each patient. That everything that should be done for the comfort and care of the patients is accomplished with this meagre allowance, can not be claimed. All that is claimed is, that the most possible is made of it, and that the condition and progress of the Institution and its inmates are creditable under existing and adverse circumstances."

During the year 1879, the Commissioners created a Board for inspection, consultation, &c., which in some measure assimilates the Institution, in its supervision by the Commissioners and this Board, to that of the State Asylum, where the Board of Managers have the power and exercise the responsibility of the entire management. This Board consists of Drs. James R. Wood, Alfred L. Loomis, Austin Flint, Jr., Charles I. Pardee, M. A. Pallen, Edward G. Janeway, Allan McLane Hamilton and W. V. White.

The Institution is over-crowded, and Dr. Macdonald reiterates the demand for increased accommodation.

ASYLUMS FOR INSANE CRIMINALS.

Among the suggestions contained in the late address of Governor Long, of Massachusetts, on the subject of State Charities, we are glad to see one relating to the separate classification of insane criminals, and their care and custody in distinct asylums, or separate departments of penal institutions. Governor Long says:

"It is desirable that there should be a more intelligent classification of the insane, instead of herding them all together. I see no reason why, taking some of our State and County buildings, which I understand are available for the purpose, separate provision should not be made, for instance, for the *criminal insane*, a hundred of whom, perhaps, could now be collected apart, thus humanely and justly relieving the others from what they and their friends rightly feel to be a reproach and a constant personal danger, and also relieving the growing pressure of numbers to be provided for in present quarters. I am advised that this classification should be made at an early date."

It is matter of extreme gratification to see, even at this late day, one more State, if indeed the Legislature of Massachusetts shall resolve to carry out the Governor's recommendation, falling in with the policy adopted in New York, as long as twenty-one years ago, in regard to the separate provision for insane criminals. It seems incredible that this most important measure should have waited so many years for imitation in this country, and that what has been so long recognized in this State and in Great Britain, as an obvious measure of necessity, should still be overlooked, to use the mildest term, in nearly all the States of this Union. One could hardly overestimate the deleterious and demoralizing influence on a body of patients from the general mass of the community, subjected simply to the

misfortune of a disease that has disordered their reason, than the forced association and companionship with convicts and outlaws from society, whose antecedents are generally of the worst description, and whose insanity, in many cases, instead of eliminating, has only supervened upon and intensified an inbred criminal disposition and habit of thought.

The law establishing and regulating the Asylum for Insane Criminals at Auburn, in this State, will be found in the digest of the New York Statutes of Insanity, revised and consolidated in Chap. 446 of the Laws of 1874. From this it will be seen that not only convicts in our State Prisons, who become insane during confinement can, on proper examination and medical certificate, be remanded to this institution, but also any person under indictment for crime, either on or before arraignment, may, by summary process in the Court of Oyer and Terminer, be examined as to his sanity, and, if found insane, be remanded to this asylum, or any other of the State asylums, as well as those who are acquitted on trial on the ground of insanity. It lies in the breast of the court to ascertain the fact and continuance of such insanity, and to order the person into confinement in any of the State institutions. Similar powers are given to the Governor and to County Judges. Similar provisions are made in the case of prisoners in penitentiaries, and criminals that may be found in other State asylums. When a convict recovers before the expiration of his sentence, he is remanded to prison to serve out his sentence. If he continues insane after the expiration of his sentence and is safe, he may be sent back to the county from which he was sentenced to prison, or his friends, on sufficient security, may assume his charge, or he may be retained by order of the County Judge. When a person under indict-

ment recovers, he is liable to the resumption of criminal proceedings. All other necessary details and contingencies are provided for.

The last report of the Auburn Asylum (to October 1, 1880,) shows that the number admitted, since its opening in 1859, has been 574; discharged recovered, 143; remaining, October 1, 1880, 149.

The Criminal Asylum at Broadmoor, in England, has 478 patients—370 men and 108 women—of whom 41 were certified insane before trial, 113 were so certified on arraignment, 244 acquitted for insanity, and 80 certified after sentence. The classification here takes into account not only the broad distinction between the "convict class," or those who become insane after sentence, and have developed the criminal disposition, on the one hand, and on the other those who committed their deeds under the access of insanity—a very different class—but also taking into account the individual antecedents, the nature of the crime, the peculiar form of derangement, and other circumstances. As a matter of fact a large proportion of those cases found insane before arraignment, or who were insane at the commission of their offense, are sent to ordinary asylums as in New York. We observe, also, that in England as here prisoners, whose sentences expire before recovery, are generally sent to the County asylums; but, by a sort of common consent, these institutions pass them on to the "Fisherton Home" in Salisbury, a special private establishment expressly designed for such cases. We assume that these cases are those whose friends have assumed the responsibility of their support.

Besides Broadmoor in England, and Fisherton House, there is a similar institution at Dundrum in Ireland, and at Perth in Scotland. Whoever reads the Commissioners' reports of these institutions, and especially

the memoranda of Dr. Manning in regard to them, will be readily convinced that such arrangements are simply a necessity, and that the asylum system of any State must be essentially defective without them.

SUMMARY.

STATE COMPTROLLER ON ASYLUMS FOR THE INSANE.—During the summer (1880) I have visited every State Institution and every State Insane Asylum, with one exception. With my very short experience in the financial management of such institutions, it would be folly for me to express a decided opinion, either in praise or condemnation of their present management in this particular. Their books were willingly shown me and were kept in an accurate and systematic manner, showing every item of expense. Though there may be petty expenditures that might be cut off, I do not believe there is extravagance. The buildings of the several institutions were well cared for and of a durable character, but in one or two cases constructed with a lavishness altogether useless. In its provisions for the housing of the insane the State has been most liberal, and with the completion of either the Binghamton or the Buffalo Asylum, may well halt in this line of expenditure. The Legislature must bear in mind that many counties are providing for their own chronic insane, by the erection of proper buildings, which by law must be approved of by the State Board of Charities, and there is, therefore, no danger of the construction of unsuitable or badly ventilated tenements. If the counties have farms attached to these institutions, upon which they can utilize the labor of their chronic insane, they can undoubtedly maintain

them at a weekly cost not in excess of the amount paid by them to the State institutions, and the "herding" together of large numbers of this unfortunate class will be avoided, and their labor more advantageously employed.

It is not within my province to speak of the treatment of the insane, but I can not refrain from saying that in all the asylums which I visited, I found the patients comfortably clothed, in appearance well fed, and their sleeping rooms and wards, in the main, well ventilated. I saw patients in restraint, but I saw none in cruel restraint, nor do I believe, judging from the men who are at present at the head of our State asylums, that cruelty or neglect in any form is either allowed or practiced.

Asylum Fires.—There seems to have been a singular fatality recently among lunatic asylums, as far as fires are concerned. The recent disastrous one at St. Peter, Minn., is still fresh in our minds, when we are called upon to chronicle a similar occurrence at the State Asylum, Danville, Pa. The fire broke out on Saturday evening, March 5th, in a closet of one of the womens' wards, which was temporarily vacated for painting. As far as we are informed, the cause of the fire is unknown.

At the time the alarm was given, many of the patients were assembled in the Chapel, and steps were immediately taken for their safety, as well as that of those remaining on the wards. The entire number of patients were removed—but four men eloped.

The center building, the eastern wing and all but eight wards of the western wing have been destroyed; these and the engine-house and out-buildings alone remaining. The loss is estimated at from $400,000 to

$450,000, on which there is an insurance of $266,500.

Accommodations for the patients have been found in the other State Asylums of Pennsylvania.

On Sunday morning, March 6th, while the fire at Danville was burning, an attempt to burn the Asylum for the Insane at Topeka, Kansas, was discovered. Some person had lighted a fire against an outside door at the foot of one of the stairways of the wards. After the flames were extinguished, some paper, candle wicking and a package of powder were discovered on the door-sill. An insane man who had been wandering about town and preaching on the street corners, was arrested on suspicion and found to be the incendiary.

School for Feeble-Minded Youth.—Miss Eleanor W. Rose, has opened a home school for this purpose at Colchester, Conn., and it has now been in successful operation for more than a year. Just such a school as this has long been needed, and the one under Miss Rose's direction seems to have been opened under the most favorable auspices.

University of Pennsylvania.—We are glad to hear that this University has established a lectureship on Insanity, and that Dr. Charles K. Mills, of Philadelphia, so well known as a contributor to the literature of mental and nervous diseases, has been appointed lecturer. He will give clinical instruction in the Insane Department of Philadelphia Hospital, and is prepared to visit with his class the Norristown Asylum, as well as other institutions in the vicinity of Philadelphia.

New Journals.—There have lately appeared three new quarterly journals devoted to mental and nervous diseases. 1. The *Archives de Neurologie*, published

in Paris under the direction of Prof. Charcot, with M. Bourneville as editor-in-chief. 2. The *Revista Frenopatica Barcelonesa*, published at Barcelona, and edited by Dr. Juan Giné y Partagas. 3. *L' Encéphale*, under the editorship of MM. Ball and Luys. Its columns are open for: *a.* Original contributions. *b.* Didactic lectures. *c.* Articles on the medical jurisprudence of insanity. *d.* Clinical cases. *e.* General reviews on topics of current interest. *f.* Bibliographical notices. *g.* Reports of societies presenting discussions on nervous and mental diseases.

—The Thirty-Sixth Annual Meeting of the Association of Medical Superintendents of American Institutions for the Insane, will be held at the Rossin House, in the city of Toronto, Ontario, commencing at 10 o'clock A. M., on Tuesday, June 14, 1881.

When Assistant Physicians represent an Institution, a notice of that fact should be sent to the Secretary.

Resolved, That the Secretary, when giving notice of the time and place of the next meeting, be requested to urge on members the importance of prompt attendance at the organization and of remaining with the Association till the close of its sessions.

JOHN CURWEN, *Secretary.*

HARRISBURG, PA., March 15, 1881.

OBITUARY.

Isaac Ray, M. D., LL. D.—The death of Dr. Ray, on the 31st of March last, at Philadelphia, where he took up his final residence in 1867, while it brings us a sudden and sorrowful consciousness of irreparable loss to the profession, at the same time recalls the sense of satisfaction with which we look upon the career of a man eminent and honorable in his day and generation, who leaves behind him permanent monuments of his usefulness, and the beneficient influence of a life and labors that extended beyond the allotted limits of three score and ten years.

Dr. Ray was born at Beverley, Mass., January 16, 1807. His literary education was received at Phillips Academy and Bowdoin College, when he defrayed his expenses by teaching school during the vacations, a discipline which, it is safe to say, has been as fruitful, at least as any other, in forming the character of the distinguished men of our country. He commenced the study of medicine in the office of Dr. Shattuck, of Boston, and graduated at Harvard Medical School in 1827. He entered upon the practice of his profession in Portland, Me., where, in 1831 he was united in marriage to the estimable lady who has been called to mourn his decease at a date just two months short of fifty years of a harmonious and happy married life. He soon afterwards removed to Eastport, Me., where, in 1838, he produced and published his first work, "The Medical Jurisprudence of Insanity," a book which has passed through six editions, and has been largely quoted by criminal lawyers, though some of its positions and ideas, especially those of a so-called moral insanity, have been controverted in this Journal and

elsewhere, and are not perhaps generally accepted, though Dr. Ray was not a man who, on this account, would lose the courage of his convictions.

In 1841, Dr. Ray was appointed Superintendent of the State Hospital for the Insane at Augusta, Me., where he remained till 1846, when he accepted an appointment to the Superintendency of the Butler Hospital, at Providence, R. I., which was then about to be established. After a short visit to Europe, and an examination of some of the principal institutions of England and the Continent, he returned to Providence and supervised the construction of the buildings for the Butler Hospital, which was chiefly the result of private munificence, and which was finally opened for the reception of patients in 1847. In this work he had the assistance of Dr. Bell, of the McLean Asylum, who contributed materially in the arrangement of the details. In this Institution, Dr. Ray remained a laborious administrator and faithful student of this great specialty for the benefit of the public—*non sibi sed toti*—until the year 1867, when, impelled by considerations of health, he resigned, and removed to Philadelphia, where he has since resided.

Dr. Ray was one of the "original thirteen," who, in 1844, organized the "Association of Medical Superintendents of American Institutions for the Insane," and was its President from May, 1855, to May, 1859. In 1863, he published a second work, entitled "Mental Hygiene," and, in 1873, a third entitled "Contributions to Mental Pathology," a title which was probably intended to cover no more than such "contributions" as he had already made in the way of papers, review articles, and reports from time to time pertaining to the subject of insanity. No less than twelve of them are papers which he had contributed to this JOURNAL, to

which he has been a frequent contributor through its whole history; and our readers will allow that for graces of style and breadth of information, few contributors have been more pleasant and interesting. In Philadelphia, where his health became visibly improved, his life was far from an idle one. Besides the frequent calls upon him for professional consultations, and as an expert in criminal cases before the courts, or in testamentary disputes, his pen was pretty constantly engaged upon work for the medical and literary journals, and papers for the various associations to which he belonged, such as one lying before us on "Recoveries from Mental Disease," read before the College of Physicians of Philadelphia, May 7, 1879. Dr. Ray was seldom or never absent from the meetings of the Association of Medical Superintendents, and kept up the liveliest interest in its discussions up to the time of his death. Only last year he read a paper before it, at the meeting in Philadelphia, on the "Increase of Mental Disorders," and took part in the usual discussions with a wisdom and pertinency that always commanded the respect and admiration of his fellow members. Dr. Ray was not a stranger to the treasures of general literature. His very ingenious *brochure* on the "Ideal Characters of Hospital Officers," suggested by a tractate of the quaint old Thomas Fuller, and read at the meeting of the Association in Baltimore, in 1873, will be well remembered by many of our readers as a remarkable *jeu d' esprit* out of the usual line; and it is not too much to say—as was implied in some impromptu verses made by one of the members on this occasion—that the charming description of the "Good Superintendent" was an unconscious delineation of his own character and career. As the poet says of Socrates:

"And what he taught, he was."

Dr. Ray was also an interested reader of religious works, and a man of strong religious conviction. His funeral took place at Providence, from the chapel of the Butler Hospital, where his principal life-work had been, and the interment was in the adjoining cemetery. The Congregational minister who officiated, testified in an emphatic manner to the depth and reality of his religious character, as well as to the eminence and beneficent influence of his scientific attainments.

Dr. J. C. Hawthorne.—Dr. Hawthorne, of the Oregon Asylum for the Insane, died of apoplexy, on Tuesday, February 16th, at the age of sixty-two. He was born at Meadville, Pa., March 12th, 1819. In 1850 he went to California, and in the year following commenced the practice of medicine in that State.

In 1857 Dr. Hawthorne removed to Portland, Oregon, where he has since resided, and in 1858, associated with Dr. A. M. Loryea, now of San Francisco, undertook the charge of the County Hospital. Subsequently they assumed charge of the State insane, by contract, an arrangement which continued in force for several years.

As Superintendent of the Asylum, Dr. Hawthorne gave entire satisfaction, and in his death the State loses an exemplary, public-spirited citizen, and a capable and intelligent official, the profession a member of large experience and ripe knowledge.

FOREIGN REPORTS.

The following reports have been received:

ENGLAND:

Report of the County Lunatic Asylum at Prestwich: 1880.

Thirty-Third Annual Report of the Somerset and Bath Pauper Lunatic Asylum: 1880.

Twenty-Third Annual Report of the Cambridgeshire, Isle of Ely, and Borough of Cambridge Pauper Lunatic Asylum: 1880.

Eleventh Annual Report of the Lunatic Asylum for the Borough of Leicester, situate at Humberstone: 1880.

Thirtieth Annual Report of the Asylum for the Insane Poor of the County of Wilts: 1880.

WALES:

Twenty-Eighth Annual Report of the Joint Lunatic Asylum at Abergavenny, for the Counties of Monmouth, Brecon and Radnor: 1880.

SCOTLAND:

Sixtieth Annual Report of the Directors of the Dundee Royal Asylum for Lunatics: 1880.

Reports of the Royal Lunatic Asylum of Montrose: 1880.

IRELAND:

Forty-Sixth Annual Report of the Waterford District Lunatic Asylum: 1880.

Annual Report of the Richmond District Lunatic Asylum: 1880.

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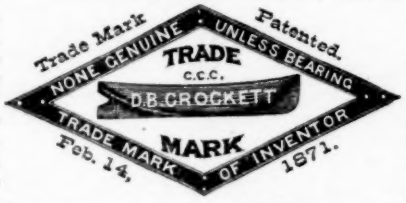

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